

Radio Control **CAR ACTION**

THE WORLD'S LEADING R/C CAR MAGAZINE

Lexan Body **SPECIAL**

- Body Buyers' Guide
- More Paint Tricks
- How To Mount Bodies

**12 New
Pit Tips**

TURBOdyno
Knowledge *is* power

Gas Racing Invades Georgia!

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First Drives

TRINITY **EV10ss**

Joel Johnson with
the new Trinity
Evolution 10ss

MUGEN **Stadium Truck**
SCHUMACHER **Cougar 2000**

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EDITORIAL



MAKIN' TRAX

YOU SAY you can't get enough of R/C cars? Do you read and re-read your issues of *Car Action* until they're tattered? There's no doubt that, to many, *Car Action* has become the *only* mag to read. You probably thought that it couldn't get any better. But now we're about to blow your socks off with a whole new medium—*video*!

We've teamed up with the cinematic talent of Broadway Productions, and the result is *Car Action's ActionTrax*—the first video magazine devoted totally to radio-control cars. If you didn't get enough tech tips, product features and race coverage in this month's *Car Action*, just pop *ActionTrax* into your VCR.

ActionTrax is designed to complement each issue of *Car Action*, and many of the products and events you read about each month will also be showcased in the video. In keeping with the video-magazine format, there will be plenty of how-to segments, as well as interviews and driving tips from today's hottest R/C drivers. Also, look for cutting-edge race coverage in the popular ESPN style, using multiple camera angles and in-car cameras that make you feel as if you're inside the car!

Naturally, *Car Action* will continue to bring you everything you've come to expect from the world's leading R/C car magazine, but now it's even better. Imagine reading a review of a killer new car and then being able to watch it tear up the track on video! As you can guess, I'm very excited about this project. If anything deserves to hit the "little screen," it's R/C cars.



The ActionTrax control room.

Frank

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SUBSCRIPTION PRICES:
U.S. & Possessions (including APO & FPO): 1 year (12 issues) \$29.95; 2 years (24 issues) \$54.95. Outside U.S.: 1 year \$42.95; 2 years \$80.95 Payment in U.S. funds.
Subscription inquiries: 1-800-877-5169

RADIO CONTROL CAR ACTION (ISSN 0886-1609) is published monthly by Air Age, Inc., 251 Danbury Rd., Wilton, CT 06897, USA. Connecticut Editorial and Business Office, 251 Danbury Rd., Wilton, CT 06897. Phone: 203-834-2900. FAX: 203-762-9803. Y.P. Johnson, President; G.E. DeFrancesco, Vice President; L.V. DeFrancesco, Secretary; Yvonne M. DeFrancesco, Treasurer. Second Class Postage Permit paid at Wilton, Connecticut, and additional Mailing Offices. Copyright 1993 by Air Age, Inc. All rights reserved.

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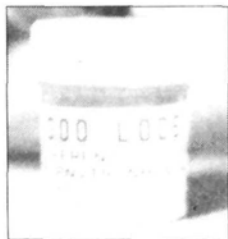
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LETTERS

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Letters," *Radio Control Car Action*, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

FYI

In a previous issue, we listed Tidewater Imports as the importer of Picco Engines. All Picco R/C car engines are distributed solely by Ron Paris. We apologize for the error. If you're interested in Picco engines, contact Ron at Paris Racing, 4254 Independence St., Chino, CA 91710; fax (909) 465-0089.

BEACHIN' IT

Let me start out by saying that your magazine beats everything on the newsstand. I have one question: every time I talk with my friends at the hobby shop, we get into an argument. They say that you're not supposed to race R/C cars at the beach. But I argue that almost every time I see one of your "Track Reports," the cars are racing on sand. Could you please tell us if it is all right to race our cars on sand? And if it is all right, what precautions should we take? Keep up the good work.

DAVE CHNOWSKI
 Ridgefield, CT

Well, Dave, the reason that we shoot some of our "Track Report" cars on the beach is strictly for aesthetics. We simply get much more radical shots on the soft sandy beaches here in Connecticut. As a matter of fact, Ridgefield is right near our town of Wilton. You might even know of our secret "photo shoot" beach. As for your question, it isn't the best idea to race your R/C car on the beach. You can do it, but you'll have to take it apart and clean it immediately. Certain precautions, such as sealing your

receiver in a balloon or a plastic bag, and using a motor endbell filter/cover might help, but we still don't think it's such a hot idea. The gritty sand tends to wreak havoc on trannies and suspension joints. Try to stick with local tracks, or "harder" sand areas. JH

NITRO OR GAS?

I am going to buy a Traxxas Nitro Hawk. I have chosen the factory-assembled kit with the installed radio gear. I have never bought a gas car before. My question is: will I need to buy special fuel, or can I use the regular fuel from the gas station?

SAM UFADDELL
 El Paso, TX

Good question, Sam! We always assume that everyone knows these minor details, but I'm sure that the recent nitro craze is attracting people who have no idea what's going on. To answer your question: yes, you do have to run special fuel. Forget trying regular gasoline. Your truck won't run on it, and you might cause a fire and really hurt yourself. Your local hobby shop should be able to help you out with some 2-stroke model-engine fuel (stay away from R/C airplane fuel; its content is slightly different). If they can't help you, then your next step is to order some from a mail-order company.

For more info, check out our April '93 issue. It includes features on maintaining your engine and choosing fuel, and there's also a nitro buyers' guide. Everyone out there who is thinking about buying a nitro-powered R/C car or truck should read that issue a few times! Also, stay tuned to our "Nitro News" column. Our good buddy Jeff Bronstein always has the latest and greatest nitro tips. Stick with it, Sam—and all you other nitro novices. It only gets easier with experience. Good luck!

JH

"DANIMAL" SPEAKS

Greetings, my friends and fellow R/Cers! Your magazine is the epitome of all R/C magazines (like that wasn't known). I probably would not exist without it. Well, maybe I would, but not easily. I love your "Track Reports" blah blah blah.... Well, enough kissing up. Please expand my knowledge by answering these questions:

1. Can I keep my modified motors spinning without spending enough money to pay off the national debt?
2. Which came first—the chicken or the egg?
3. Will the DuraTrax gas-conversion kit for the Losi LX-T fit the Junior T?
4. What color is Chris Chianelli's hair? Is it purple? Is it black? Does it change with body temperature like "hyper hair" or something? What weight of shock oil does he use in it?

Well, my charger has clicked, and my truck is ready to run. Thanks for the mag *Car Action*. Long live R/C!

DAN (DANIMAL) BLAIR
Valparaiso, IN

All right, Danimal, here goes...

1. Keep it clean! Oil your bearings, always inspect for a worn or damaged commutator, replace worn out or damaged brushes, and whenever it needs it, cut the comm. You shouldn't have to spend a fortune to keep it running well. But that will be \$100 for my advice.
2. Well, when I'm at a restaurant and I order eggs, it usually takes anywhere between 8 and 10 minutes for them to get to me, while a chicken takes anywhere from 10 to 20 minutes.
3. Sorry, the DuraTrax LX-T conversion kit works only on the LX-T—not the Junior T.
4. We really have to stop bashing on Chris. I mean, c'mon, he's old, he's feeble, his bones are brittle. He can't take too much more of this...well all right, maybe we'll make an exception. To tell you the truth, Chris's hair is actually a wig that he accidentally put through his clothes dryer. He's completely

(Continued on page 174)

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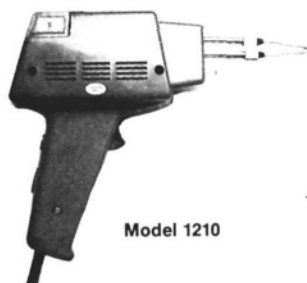
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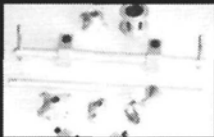
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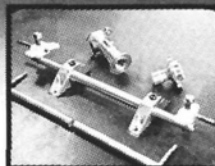
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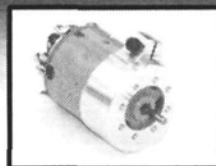


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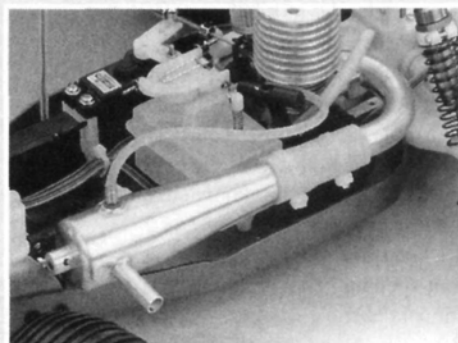
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Dynamite Nitro Hawk Tuned Exhaust

When you want to boost your Traxxas Nitro Hawk's speed, look to the Dynamite Nitro Hawk Tuned Exhaust System (NHTES) for fantastic performance enhancement. The Dynamite NHTES includes a dual-chamber ROAR-legal tuned pipe that's specifically designed for use with the Nitro Hawk's Image .12 engine. The NHTES increases low, middle and top speed by as much as 25 percent. It comes with everything you need for installation: a complete guide shows you how to mount the system, a 180-degree header fits right onto the Image .12 engine, and a durable silicone coupler allows you to mate the header and pipe. All the necessary hardware is included, and the pipe is even pre-tapped for the stock pressure fitting. For a relatively simple and inexpensive way to improve the Nitro Hawk's speed, this tuned-exhaust system can't be beat!

Part no.—DYN2260; price—\$59.95.

Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-0022.



BOLINK

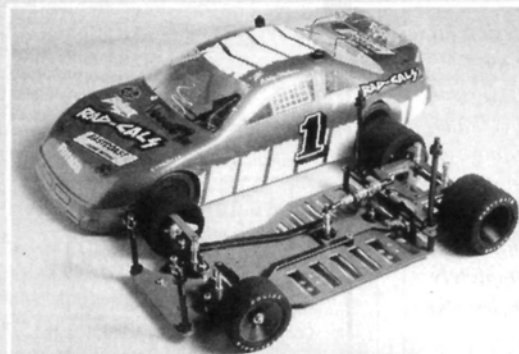
LTO Pro Superspeedway Kit

This all-new, 1/10-scale kit from Bolink is its most advanced yet! It features a two-piece front axle with independently adjustable caster and camber, and it has increased front-suspension travel for better handling. The rear end uses two suspension balls for side flex, and a ball-bearing and graphite hinge for fore and aft movement. The rear suspension consists of an adjustable coil-over shock and adjustable silicone dampers that control side loading. The motor mounts are made of high-tensile-strength aluminum. Nothing has been overlooked! This car has all the features you'll need to compete anywhere—from

your local short track to the largest superspeedway!

Part no.—BL-1385; price—\$349.95.

Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (404) 963-7334.



GLOBAL HOBBY DISTRIBUTORS Panda Nitro Pickup

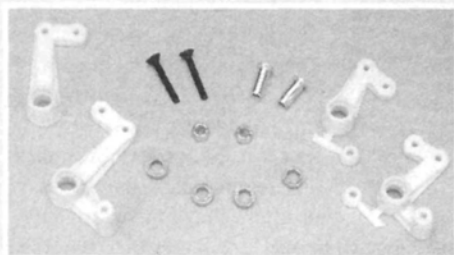
The new, almost-ready-to-race Panda Nitro Pickup's high-performance features include a factory-assembled chassis and transmission; a Magnum GP .10 engine with a handy recoil pull-starter; a super-quiet expansion-chamber muffler; a fuel tank with a flip-up filler cap and a fuel primer pump; a sturdy, lightweight 6060T4 aluminum-alloy chassis; a lower H-arm/upper control link 4W independent suspension; adjustable, oil-damped, coil-over shocks; spike rear tires and ribbed front tires for superior traction and handling on loose dirt surfaces; simulated aluminum truck wheels; a chassis stiffener bar; a sealed gearbox with differential gears and shaft drive; all-bronze Oilite bearings; a steering servo-saver; and a clear polycarbonate truck body with peel-off overspray film.



Part no.—014800; **price**—\$350.

Global Hobby Distributors, 10725 Ellis Ave., Ste. E, Fountain Valley, CA 92728; (714) 963-0133.

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MIP, 746 E. Edna Pl., Covina, CA 91723; (818) 339-9007.

RPM Long Shank Rod Ends

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RPM, 14978 Sierra Bonita Ln., Chino, CA 91710.



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WHAT'S NEW

TD ENTERPRISES The Protector

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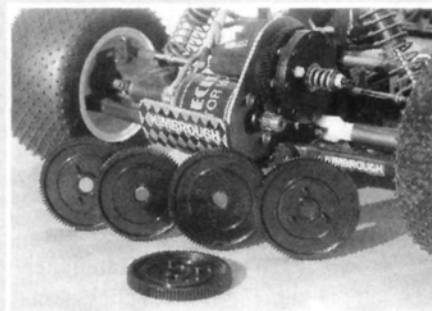
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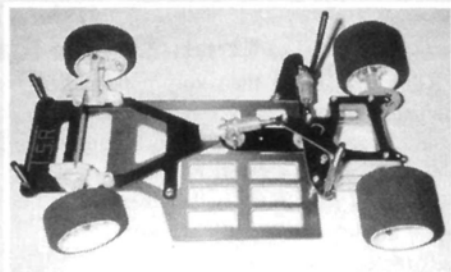
Kimbrough Products, 1420 East St. Andrews Pl., Santa Ana, CA 92705; (714) 557-4530.



TSR 10LSS LTO Chassis

The TSR LTO 1/10-scale, low-profile, layered chassis was developed using stress analysis and performance-enhancing automotive software. Its features include TSR's lateral damping system and a parallel axis battery configuration, and the kit includes a chassis plate, a "V" brace, a rear support, a top brace and a nerf wing.

Part nos.—TSO-LTO (graphite), TSO-LTO (fiberglass); prices—\$140, \$110. TSR; distributed by T.M. Racing Components, 49679 Leona Dr., Chesterfield, MI 48051; (313) 949-3506.





BRT SOFTWARE Pro Count Race Management Software

Pro Count software has been designed for clubs and tracks that can't afford expensive transponder systems but need convenience and accuracy to set up, time and score races. With Pro Count, you can organize drivers by class and heat; identify and resolve frequency conflicts; time races; count laps; record qualifying

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Pro Count will run on IBM and compatible PCs that have at least 256K of memory. It will work with color or monochrome monitors, and it's available on either 3.5-inch or 5.25-inch disks. It comes with a complete user's manual and a money-back guarantee.

Price—\$69.

BRT Software, 4009 2nd Pl. NW, Rochester, MN 55901; (507) 282-7793.

CHICAGO MODEL INTERNATIONAL AC/DC Hogger Charger

CMi's AC/DC, full-function charger offers high-performance at a very low price! Its features include a large, 3A power supply with a DC ammeter, a 30-minute auto-shutoff timer, trickle-charge capability, current adjustment, AC/DC input, charge-output monitors and LED monitors for all functions. The Hogger will charge any battery from 4.8 to 8.4 volts to almost any capacity. It even comes with an adapter for Tamiya or Kyosho connectors. The AC/DC Hogger is covered by a five-year limited warranty.

Part no.—711; price—\$40.

Chicago Model International, P.O. Box 170, Deerfield, IL 60015; (708) 735-8500.



MOTOR MAN Master Blaster

The Motor Man Master Blaster is the perfect battery for all types of R/C. Owing to its advanced SCR technology, it has a higher capacity and is more durable. It comes in a 6-cell stick pack with a



Tamiya connector, and it includes instructions on battery maintenance. It's also priced right!

Part no.—MMBLAST; price—\$19.95.

Motor Man, 850 Osage Ave., Sacramento, CA 95828; (916) 381-7491.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here doesn't constitute an endorsement by *Radio Control Car Action*, nor is it a guarantee of product performance or safety. When writing to the manufacturer about any product described here, be sure to say you read about it in *Radio Control Car Action*.

TRINITY® Evolution 10

MAGIC TRICKS

by Joel "Magic" Johnson®
current IFMAR World Champion

Little details sometimes make that big difference when it comes to winning or just being another statistic in a bottom main somewhere. In today's highly competitive R/C racing world, you must maximize your car in every way to ensure that it performs 100 percent.

One item that is really a performance factor is your choice of pinion gears. The gear mesh—or lack of one—will directly affect your horsepower. Also, the heavier the pinion, the slower your car will accelerate. Magic Motorsports Zero Gravity™ pinions were designed just for racing. They are the smoothest, most quietly meshing pinion gears available. They're made of 6061 T6 aircraft-grade aluminum and coated with a proprietary aerospace Teflon coating that actually penetrates into the aluminum. This gives Zero Gravity pinions the lowest coefficient of friction of any pinion gear on the market.

You can actually see a speed difference by changing from one of our pinions to another brand; I wouldn't use any other pinion for my race cars. If a Zero Gravity pinion is good for only 1/1000 of a second per lap, at the end of 40 laps, you would be 4/100 of a second faster. That's enough to make the difference from the "A" Main to the "B" Main at a big race. Zero Gravity pinions come in both 64 pitch (15 to 49 tooth) and 48 pitch (12 to 30 tooth), and they cost \$5.99 each.

Another way to gain an advantage is to get your car as light as the rules will allow. We have some new chassis parts for the Evolution 10ss that get your car right down to the limit, even with a battery pack and sway bar. These are the parts that I used on my EV10ss to TQ and break my own track record at the ROAR National Championships at the "Whip."

EV4045 "Lite Superspeedway Chassis"; \$82—15 grams lighter than the kit chassis.

EV4046 "Lite Bottom Pod Plate"; \$29—2 grams lighter than the kit plate

EV4047 "Lite Nerf Wing"; \$10.99—3 grams lighter than the kit nerf wing

EV4048 "Lite Chassis Brace, Shock Mount"; \$26—4 grams lighter than the kit
By using these parts, you have a total savings of 24 grams—almost an ounce!

You can also buy all the items together in a package deal where you save \$10—**EV4049 "Lite Graphite Upgrade";** \$137.

Well, I hope that these tips will make your Evolution car the fastest on the track.

Until next time,
Joel "Magic" Johnson®

ADVERTISEMENT



INSIDE SCOOP



by CHRIS CHIANELLI

IN SEARCH OF FUN AND GLORY, 'CAUSE LIFE'S TOO SHORT TO BE A SHEEP!

Team Losi is now able to offer its competitive Junior-T and Junior II at shockingly low, entry-level, retail prices: Junior II—\$129.95; Junior-T—\$139.95. Apply everyday discounts to these retail prices, and you're talking in the neighborhood of an \$80 selling price. How did they do it?—by pushing their manufacturing and technical prowess to the limit. Don't let the price fool you; these two off-road machines, which now include the latest multi-element, self-lubricating bushing technology, are the same vehicles that have proven themselves time and again as off-road winners. By doing this, Losi has given the industry very economical trucks and cars that are truly competitive. While the "Do It Right" video is no longer included with these kits, it's available separately for \$7.95. The new Junior II and Junior T probably offer the best deal in the industry. What a steal!

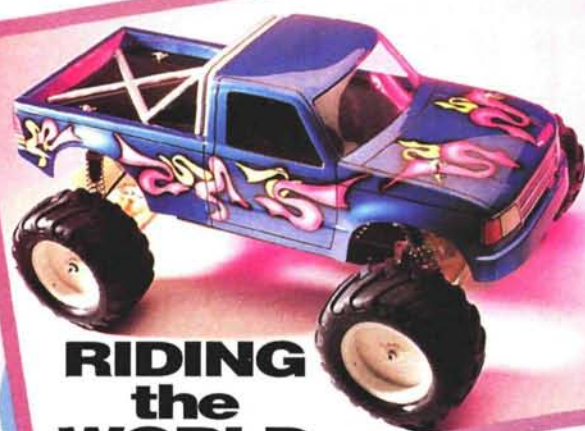


LOSI'S LOW COST OF HIGH PERFORMANCE

Bitchin' Box

Atention, all DuraTrax nitro-conversion owners! Thorp Manufacturing Inc. now produces blue-anodized, all-aluminum gearboxes for its LX-T and RC10T nitro conversions. This hot, new, anodized-aluminum gearbox for the DuraTrax LX-T (shown here) allows you to run Team Losi's ultra-sano Double-X differential. This gearbox is lightweight, and it's machined to exact tolerances for smooth, efficient operation. It requires a $\frac{3}{16} \times \frac{3}{8}$ -inch straight bearing (not included) for the front shaft of the LX-T kit. The RC10T gearbox uses slightly smaller bearings. The gearboxes retain the stock dimensions, yet they're more rigid than the standard plastic unit. All gearboxes come with holes already drilled and tapped, and both have two camber adjustment holes. The gearboxes retail for \$50.





RIDING the WORLD SCALE WAGON

Many after-market companies are jumping aboard the World Scale wagon with parts offerings. Parma International has now gone World Scale by offering the Desert Storm body in clear Lexan, which fits directly onto the MRC Desert King truck. Contact: Parma International, 13927 Progress Pkwy., N. Royalton, OH 44133; (216) 237-8650. Watch the "Scoop" pages for further World Scale updates.



A STEALTHY 2.65

With RPM's new 2.65 ratio conversion for the Associated Stealth transmission, you now have greater pinion/spur ratio selection. RPM claims less spur wear, more efficient power transfer and better run times with this lower ratio. The conversion kit includes a dyeable case and a top shaft with a gear. The bearing, gears and diff are used from the stock Stealth tranny. Contact: RPM Custom Engineering R/C Products, 14978 Sierra Bonita Ln., Chino, CA 91710; (714) 393-0366, fax (714) 393-0465.

®

Winning is What Separates Champions From Everyone Else. And We've Won It All!



Team

PUSHED

- ☐ IFMAR 1/10th, On-Road Modified World Championship - Joel Johnson
- ☐ ROAR 1/10th, On-Road, Modified National Championship - Joel Johnson
- ☐ ROAR 1/12th, On-Road, Modified National Championship - Joel Johnson
- ☐ 4-Cell Modified Winter Nationals Modified Championship - Mike Blackstock
- ☐ U.S. Oval Masters Modified Championship - Mike Blackstock
- ☐ ROAR 1/10th Speedway Modified National Champion - Ernie Bucci

Trinity Team Pushed battery championships are all in super-competitive national and international modified pro-class racing, not in stock or regional events.

TM

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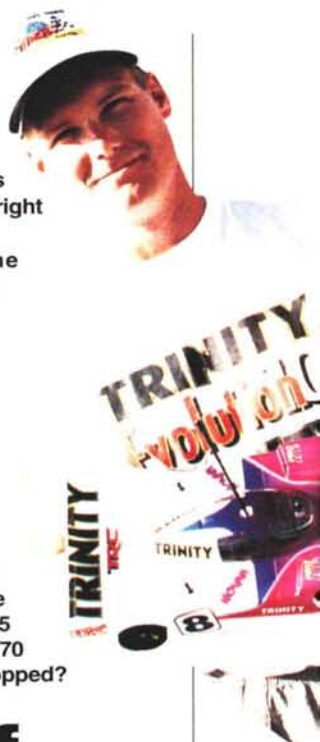
Cheap Thrills Fewer Fills

At \$269.99 retail, which translates into about \$200 after discounts, the 1/10-scale 2WD Sandmaster represents a real price breakthrough for Kyosho. Not only does the Sandmaster come with a Kyosho GS .11 glow engine (with a new, improved pull-starter), but the car also comes 85-percent built! While the car obviously is an economy model, it can also be considered a "high-mileage" model. With its new 75cc fuel tank, run times are more than 10 minutes. Here's the best part: based on the Ultima, the car is totally "upgradeable" with the wealth of after-market parts that are already out there for the Ultima series cars. Watch for the review soon.

Ever since Joel Johnson and the Trinity Revolver teamed up, it has been *the* combination to beat. From the start, this combination hit the track kickin' serious you know what, and it has walked away with two major ROAR wins right off the bat.

Using a production version of the Revolver 12ss (superspeedway), Joel took the A-Main in the ROAR Oval Nats held this past June at Lake Whippoorwill Superspeedway, while Tony Neisinger set a new track record of 46 laps in 4:05 minutes with his 12ss. The top four positions were occupied by Revolvers.

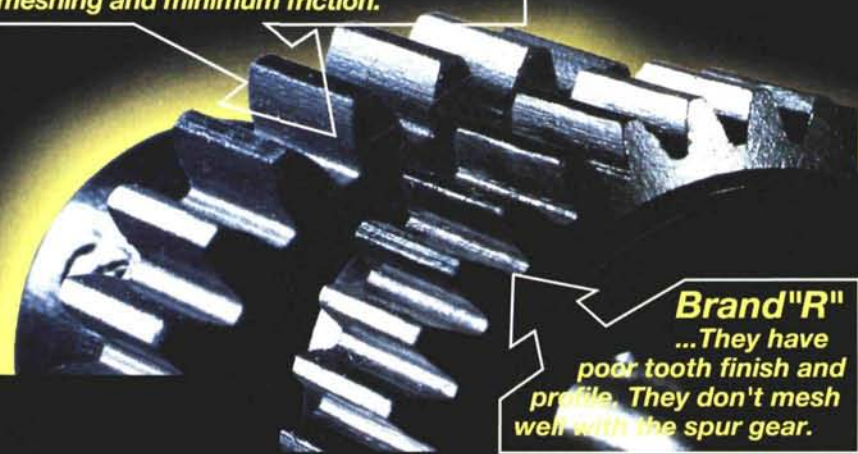
The following weekend at the ROAR On-Road Nats, Joel again took the 1/12-scale A-main (with Neisinger's 12p hot on his heels), and he TQ'd the 1/12-scale Modified. Both used the Revolver 12p (the on-road version) and Trinity's 0.5 Champion Series motors and Pushed P-170 cells. Can this "magic" combination be stopped?



Debut of DOMINATION

Zero Gravity™ Pinions

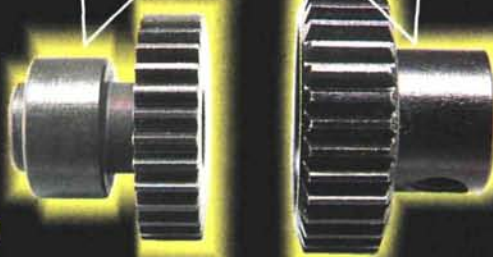
Trinity Pinions...Ours are precision machined from 6061 T-6 aircraft aluminum and teflon impregnated for smooth meshing and minimum friction.



Brand "R"
...They have poor tooth finish and profile. They don't mesh well with the spur gear.

Trinity Zero Gravity™ Pinions Are Super Light!

Brand "R" Pinions Are All So Over-Weight, Power is Reduced!



From Magic Motor Sports

\$5.99

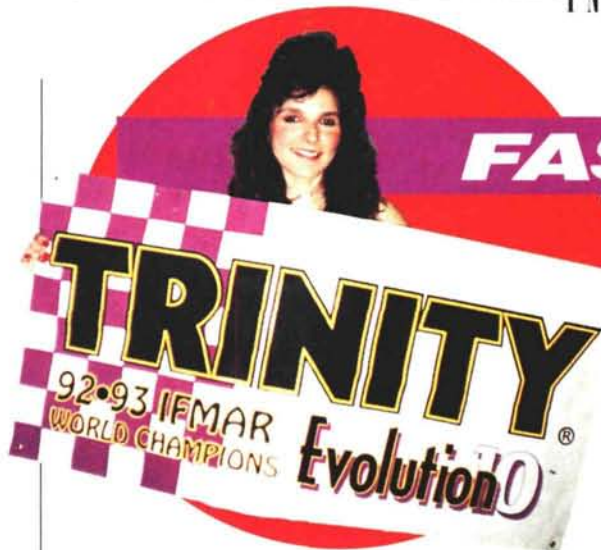
In 48 pitch from 12 to 30 teeth • In 64 pitch from 15 to 50 teeth



We Are Your Source for ALL R/C Racing Needs

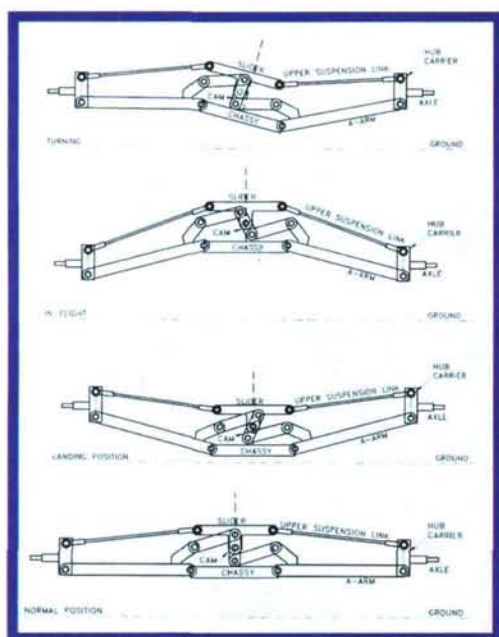
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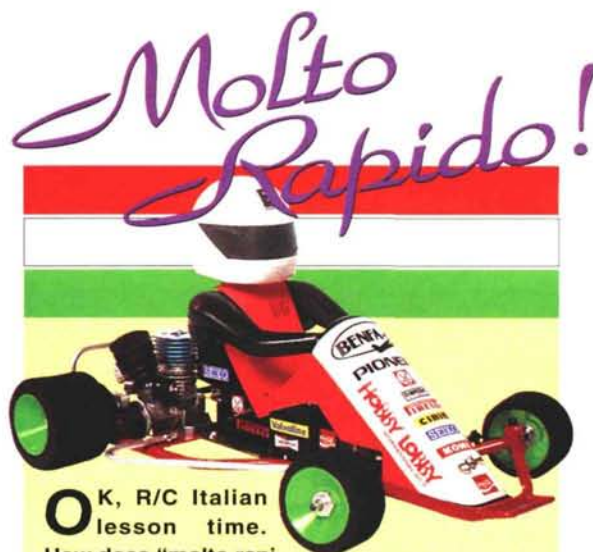
FASTEST LADY IN R/C

On June 26 and 27 at the IEDA (International Electric Drag Association) Big Bucks Nationals held at Kim's Pitshop in Totowa, NJ, Patti Boyko, owner of Pro-Class Hobbies in Totowa and a member of Team Point Blank, took low ET (1.97) of the weekend in Pro Stock 8-cell Modified. She also set a new track record of 68.18mph with her Fine Design car, which was powered by a Point Blank 10-turn Rare Earth motor and Team Pushed SCRC cells. Patti has been racing for three months, and this was her first national event. Hope to see you in the winners' circle often, Patti.



TEKIN'S ACTIVE-LINK

A chassis under development by a speed controller manufacturer? Considering Tekin President and designer Kevin Orton is an active modeler whose design skills are not confined to electronics, why not? This molded carbon (graphite) mid-engine chassis kit has Tekin's Active-Link Suspension—a feature that, according to Tekin, keeps the tires more squarely on the surface into, through and during turns; this allows higher cornering forces and, thus, lower lap times. Tekin also claims reduced polar moment, which means that the chassis can make the transition from a straight-line attitude to a cornering attitude approximately 20 percent faster than a conventional one. All parts are included to fully convert an Associated RC10 Stealth or RC10T. Stay tuned for availability and further details.



OK, R/C Italian lesson time.

How does "molto rapido" translate?—very fast! OK, R/C physics pop-quiz time. How does 5 pounds driven by a hot Italian Cippola .21 translate? The R/C geek in the first row guessed it: molto rapido! This 80-ounce, 1/8-scale, 18.5-inch-long, Go-Kart from Hobby Lobby Int'l. is mostly assembled and features a tough, welded, steel frame. The installed one-way clutch allows you to start the engine by flipping the rear wheels or by pushing the kart forward on the pavement. Electric starters are not needed. Italians have been long-time leading producers of high-quality, high-output, glow engines, and Cippola .21 is certainly no exception to this broadly accepted axiom. Here's another axiom on which to rely: if you want to go really fast, in a real hurry, contact; Hobby Lobby Int'l., 5614 Franklin Pike Cir., Brentwood, TN 37027; (615) 373-1444.

READERS' RIDES

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 251 Danbury Rd., Wilton, CT 06897. If the Ayatollah of Radio Controlla chooses your photo, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the third annual "Reader's Ride of the Year Contest" in the fall of 1993. Write your address and phone number on your letter and on the back of each photo you send, in case we need to contact you.



ROCKET RIG

This crazy-looking contraption comes to us from Hillary Gierman of Columbus, NJ. What is it, you ask? Well according to Hillary, it's an R/C, solar-powered, laser-activated rocket launcher. The system is mounted on a Traxxas Hawk, which is equipped with Pro-Line tires, a Trinity Triad motor, a Novak M-5 ESC and PTI batteries. Guiding the Hawk is a Futaba Magnum Jr., while an infrared beam launches the rocket by remote. Solar cells power the receiver, but on dark days, it needs a back-up battery. Hillary scratch-built her project using miscellaneous parts from TVs, phones, radios and a laser control system. The photo shows the rocket in the first stage of lift-off.



FAMILY AFFAIR

Thomas Valles and his wife, Shelli, race their trucks at the Scale Racing Sports track in Tempe, AZ. Both use Slot Machine motors, titanium hinge pins and turnbuckles, RPM suspension arms, and Tekin 410 ESCs. Shelli's truck is the one with the pink and purple stripes, while Thomas prefers the bugged-out look of Dahm's new Buggy body. According to Thomas, Shelli took first place in the seventh annual Arizona State Off-Road Championships in the Novice Truck class. So we know who the *real* racer in the family is! His excuse was that he had to work that weekend—pretty weak, eh? We think he was afraid of the competition!

FALLEN IDOLS

Craig Atkins of Spokane, WA, sent us this photo of his RC10T. It's equipped with Lunsford titanium hinge pins and turnbuckles, a Novak 610 RV ESC, a Peak Performance 14Q motor and a Futaba Magnum Sport radio with a 9301 servo. When Craig isn't racing, he's out with his truck chasing the neighborhood cats. Craig's dad, Lynn, shot the photo for him. Craig writes, "I recently met a long-time idol, Evel Knievel...I'm disappointed. My new idol is Super Dave." Well, Craig, we don't blame you; in our opinion, Super Dave is a lot funnier at least.



RED HOT

These two red hot monsters come from Tim Porco of Simi Valley, CA. Controlled by a Futaba Magnum Jr., the Bullhead is equipped with a Novak 410 M-5 ESC, twin Reedy Mr. R 16 triples, full ball bearings and a custom aluminum trailer hitch. The Cesa 1882 boat shown is also controlled by a Futaba Magnum Jr., and it has a Novak 410 M-5, a Hydro cooling system, twin Reedy Mr. N 19-turn triples and full bearings as well.

READERS' RIDES



EXOTIC PLANT LIFE

Juan Carlos Sala Pizzini's Kyosho Inferno has been modified with a Turbo Rex engine and many aluminum-alloy parts from Europe (mostly Italy). Other mods include a special light flywheel; modified clutch; 15-tooth endbell; Rex pipe with Rossi manifold; Torsen differentials; front and rear stabilizer bars; light wheels with racing-compound tires; Serpent gas tank; rear universals; K&N air filter; after-market wing—the list goes on. This is Juan Carlos's fourth gas car. Our question? If this one is in the trees, where are the other ones?

GET INTO R/C

That's Louis Moz of Los Angeles, CA, sitting on the hood of his Traxxas Hawk 2. Wait a minute; there seems to be a slight scale problem, don't you think? Anyway, Louis has modified his truck with a Twister, 17-turn, single-wind, modified motor, full ball bearings, a custom-painted body, a Novak M5 ESC and a Futaba Magnum Sport radio system. Louis has been into the hobby for only three months, but he assures us that pictures of his Lunch Box and Nitro Hawk are on the way. Who knows what kind of trick photography they'll feature?



BLUE BY YOU

Marc Robin's Bolink Eliminator is equipped with a Cheetah front end, a titanium axle and tumbuckles, a Trinity Joel Johnson 17-turn triple motor, a single shock system and Paragon front and rear tires. To control this hot blue machine a Futaba Magnum Jr. is helped by a Tekin 410S ESC and a Novak mini-receiver. Nice-lookin' ride, Marc.



DAVID AND GOLIATH

David Plummer of Sioux City, NE, sent along this photo of his interesting home-built truck. Its chassis is made of aircraft aluminum, and its nosepiece was liberated from an RC10. Two in-line Futaba servos steer the huge Bru-Line wheels, which are shod with USA-1 tires. The front suspension consists of wide, front A-arms with Associated shocks, and DuraTrax shocks take care of the rear. A Stealth transmission geared to 27:1 drives the rear wheels, and a custom motor mount holds two Kyosho Mega motors hooked to twin 1700 Trinity battery packs. Topping off this monster is a Kyosho USA-1 body with working headlights.

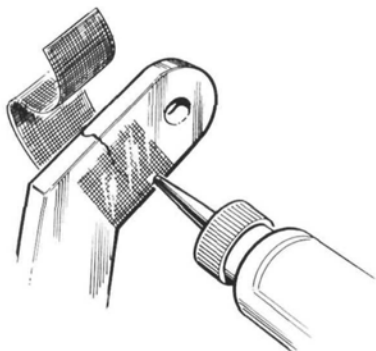


HERE COMES DA WILLYS

Our buddy from Queens Off-Roaders, Frank Celenza, sent us this photo of an R/C Willys that he used to escort his friends Ivy and Tom down the aisle at their wedding. The Willys is built around a Tamiya Mercedes-Benz C-11 chassis, and it dragged a few film canisters filled with a few coins behind it to simulate cans. According to Frank, "The car was a big hit on the dance floor later on!"

PIT TIPS

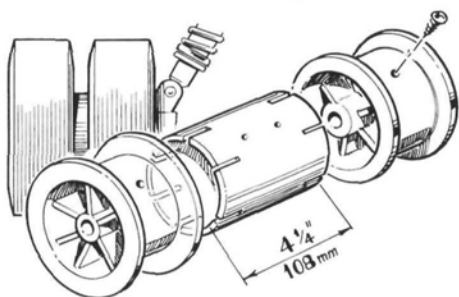
by JIM NEWMAN



EASY TEMPORARY REPAIR

To temporarily repair a broken shock mount, glue the parts together using CA, then wrap narrow fiberglass tape (from a hobby store) tightly around them. Saturate the tape with thin CA as you wrap it around the shock mount.

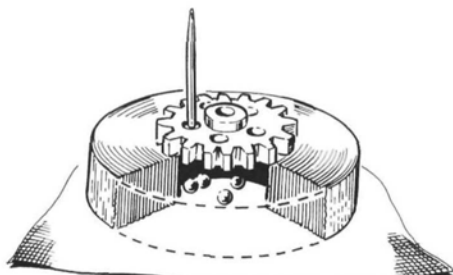
Tyson Thompson, Los Altos Hill, CA



CLODBUSTER DUALS

Cut four pieces of PVC pipe, making sure that the ends are square. Turn down or sand the diameter of each so that it will fit inside a wheel rim. Use two or three sheet-metal screws to hold the wheels in place on the pipes. With eight tires, the truck really pulls, climbs and floats on snow.

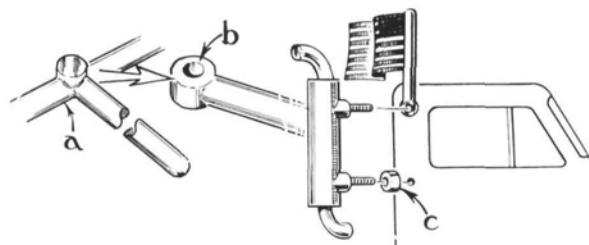
Dale Alexiuk, Roseau, MN



CAPTURED DIFF BALLS

Place a spur gear over a roll of tape, and use a wooden or plastic (not steel) dowel to press the differential balls out. The tape will prevent them from rolling away. Placing a cloth underneath will prevent the balls from rolling away when you remove the tape.

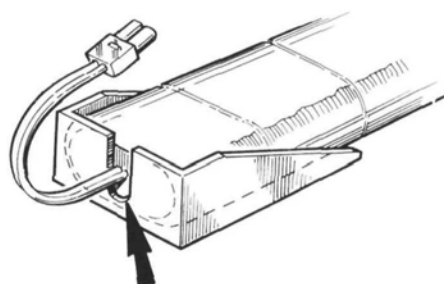
Vince Tomak, Kentwood, MI



BULLHEAD FLAG MAST

Instead of threading a flag through the roll bar, use part of the leftover chrome tree (a). Cut the stem, flatten the round portion (b) using a file, then drill through the center to make a hole for the muffler mounting screw. You can use scrap plastic to make a spacer (c) for the bottom screw. Tighten the screws just enough to allow the mast to swing down without breaking if the truck rolls over.

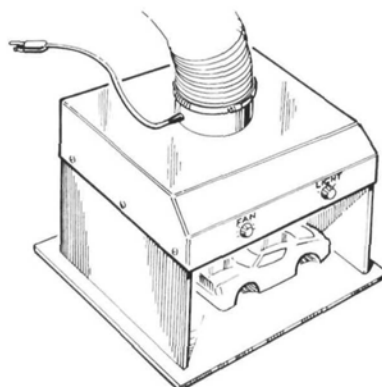
Wade Lanning, Prince George, VA



EASY-FIT BATTERY BOX

On the RC10, it's easy to tear the battery-wire insulation because the wires are pinched by the battery cup. Make a neat cut in the end of the cup to allow the wires to exit.

Michael St. Onge, Huntington Beach, CA

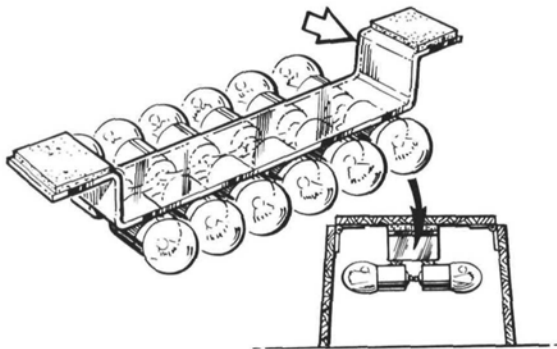


DELUXE PAINT BOOTH

Extend the sides of an old stove hood using Masonite, screws and duct tape. Then attach a piece of dryer ducting and hang it out of the window as you spray-paint. A light and a variable speed fan will make painting easier.

F.J. Nimphius, Delavan, WI

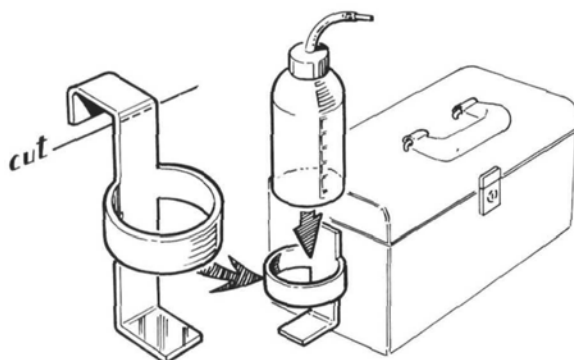
PLEASE NOTE: be sure to print your name and full address clearly on every letter and sketch you send to "Pit Tips." We have to throw away many good tips because we don't have the senders' names or addresses.



DISCHARGER PROTECTION

To protect your discharger, mount it on a 1½x10-inch piece of Lexan using servo tape. Add pieces of Velcro® brand fastener to the end tabs and attach the discharger to the underside of your folding car stand.

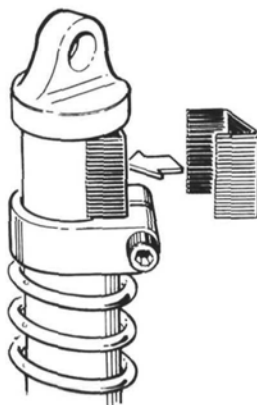
Rick Eyrich, Winter Haven, FL



FUEL-BOTTLE HOLDER

Cut the mounting tab off a plastic cup holder (available at an auto-parts store), then use servo tape to secure it to the end of your pit kit.

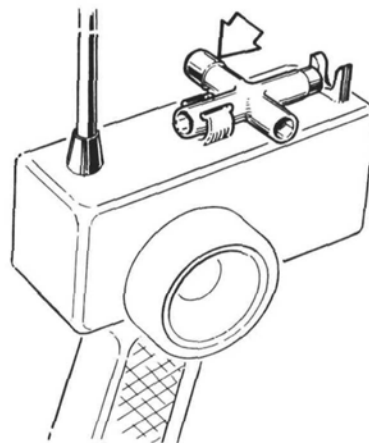
Forbes Husted, Mahwah, NJ



SHOCK SETTING GAUGE

Break off a stack of paper staples to match the required setting height. Use this simple gauge to set the height of the spring collar on each shock.

T.J. Egan, Canby, OR



WRENCH STORAGE

Snap your four-way wrench into the folding antenna lugs on top of your transmitter so that it will be handy for making rapid clutch adjustments.

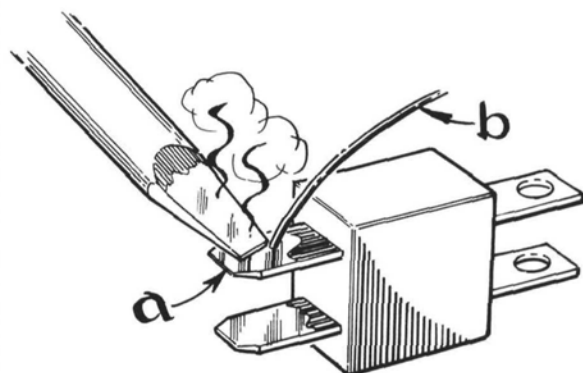
Scott Sullivan, Bolingbroke, IL



PARTS SAVER

Do all your work on a tray covered with a piece of white sheet. It will make it easier to find small parts and will prevent them from rolling away.

Jeff Bucholz, Havelock, NC



CONTACT IMPROVEMENT

This works on Race Prep Pro 2 connectors, and it should work on most others, too. If you find that they're not making good contact, "tin" each contact with a thin layer of solder.

Adrian Michalski, Wichita, KS

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd. Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

EVOLUTION

by FRANK MASI

WHAT MAKES a superspeedway car different from a roadcourse car?

To the untrained eye, it's just a matter of placing the car's batteries toward its left side to improve its ability to turn left. But there's more involved in designing a *successful* oval car; front and rear wheel track and wheelbase are crucial to an oval car's handling and stability. Most purpose-built superspeedway cars have narrow front and rear tracks and long wheelbases.

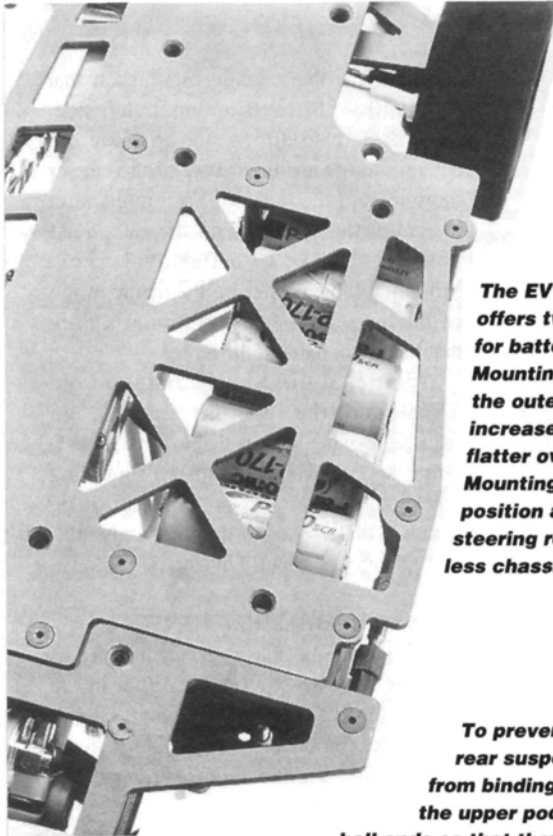
Narrow cars have less frontal area and are subject to less wind resistance, so they can achieve higher top speeds. Many racers think that shorter-wheelbase cars work better on small, tight tracks, while a longer wheelbase is more desirable on large tracks with long straights.

Taking these factors into consideration, the ideal superspeedway car should also incorporate a wide range of adjustments that will allow you to tune it to virtually any oval track—without having to buy after-market parts. Apparently, such a car does exist—the new Trinity* Evolution 10ss.

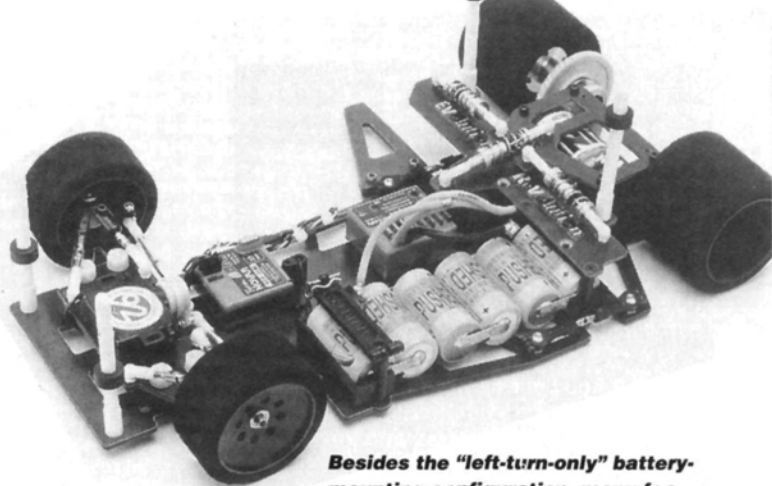
10ss



Street Fighter III

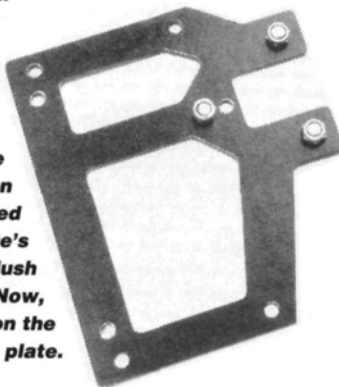


The EV10ss chassis offers two positions for battery mounting. Mounting the pack in the outer position will increase cornering on flatter oval tracks. Mounting it in the inner position allows quicker steering response and less chassis roll.



Besides the "left-turn-only" battery-mounting configuration, many features (like a narrow front and rear track) make the EV10ss different from the World Champion EV10 road car.

To prevent the rear suspension from binding, I filed the upper pod plate's ball ends so that they're flush with the retaining nuts. Now, the ball ends can't rub on the shock-mounting plate.



TRINITY EVOLUTION 10ss

Scale 1/10
Price \$369.99
Distributor Trinity

DIMENSIONS:

Overall length 13 in.
Width 7.625 in.
Wheelbase 9.94 in.
Front track 6.125 in.
Rear track 5.875 in.

WEIGHT:

Gross (w/ battery) 2 lb., 8.68 oz.

CHASSIS:

Type Plate
Material Carbon graphite

DRIVE TRAIN:

Type Direct drive
Primary Pinion/spur
Differential(s) Ball
Bearings/Bushings Bearings

SUSPENSION:

Front: Type ... Reactive caster suspension
Damping ... Floating kingpin/coil springs

Rear: Type Triad 3-dimensional damping
Damping Three Delta-type shocks

WHEELS:

Front: Type TRC ZR-1
Dimensions (DxW) 1.82x1.06 in.
Rear: Type TRC ZR-1
Dimensions (DxW) 1.75x2 in.

TIRES:

Front TRC Pro-Cut ZR1
Rear TRC Pro-Cut ZR1

ELECTRICS:

Motor, battery, speed controller not included

OPTIONS AS TESTED:

Trinity PROCAR 12-degree stock handout motor; pushed Panasonic P-170 cells; Novak 410 HPC; Novak NER 3FM receiver; Airtronics 94144 servo; JACO blue left front tire, blue/orange right front tire, green rear tires.

HITS

- Great ball diff design: it's smooth, and you don't have to take it apart to change the rear tires.
- All parts are of excellent quality.
- The infinitely adjustable suspension allows the car to adapt to any track condition.

MISSES

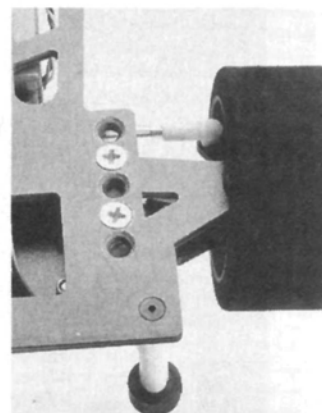
- Instructions could be clearer; switching from the supplemental text to the standard manual is confusing.
- Minor packing glitches, e.g., hardware of the wrong size.

MORE THAN MEETS THE EYE

The EV10ss, as you might have guessed by its name, is the superspeedway version of the EV10 roadcourse car that Joel Johnson used to win the very first IFMAR 1/10-scale On-Road World Championships. Besides the obvious changes—batteries mounted on the car's left side and a narrow front and rear wheel track—there are quite a few differences between the standard EV10 and its superspeedway cousin.

The EV10ss uses a narrow version of Trinity's RCS (Reactive Caster Suspension) front-suspension system, and its lower plate offers an additional set of holes in which you can mount the suspension's front link. If you attach the link to the plate's new, outermost hole, caster will decrease as the suspension is compressed. Less caster will generally give the car more low- to medium-speed steering. Trinity recommends that, at first, you use this suspension setup on the left side only. If you find that you need more steering, you can set the right side similarly.

Unlike the roadcar's in-line steering blocks, the oval version uses trailing-type steering blocks, which make the car more stable at higher speeds and allow it to track better down longer straights. The steering blocks on the oval car have axles that are 3/16-inch in diameter, as compared with the 1/4-inch-diameter axles on the standard EV10.



By mounting the front suspension in a different set of chassis holes, you can change the car's wheelbase (to one of three positions). A long wheelbase is sometimes better on large tracks, while a shorter one is advantageous on small, tight tracks.

What is Reactive Caster?

by JIM DIETER

When I'm not busy designing such cars as the Evolution 10 and 10ss, the ReFlex 10 and the new Revolver 12 for Trinity, I travel to major races with the team and offer my technical support—not just to Johnson, Blackstock and Neisinger, but to everyone who races with our cars. Most racers want to know how to set their RCS front suspensions. Though the RCS offers a multitude of track-tuning adjustments, it isn't as complicated as it looks. Here are a few of the how's and why's.

What do you do when 2 degrees of caster is just right amount for handling the infield turns, but it makes your car handle erratically through sweeping turns? You'd like to use 4 degrees of caster to handle the sweeper, but if you did, your infield cornering would suffer. That's why we developed the RCS suspension: to give racers the best of both worlds.

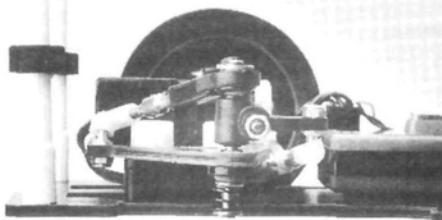
WHY REACTIVE CASTER?

Reactive caster gives your car more caster for large-radius, sweeping turns. When the suspension is compressed (as when the car makes tight turns), caster angle is reduced, and this gives the car better low-speed steering response.

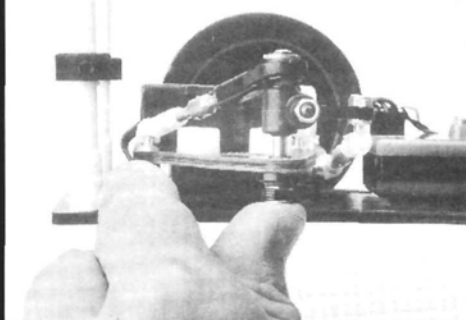


The EV10ss uses a narrow version of Trinity's RCS (Reactive Caster Suspension) front suspension. The main plate has an additional set of front rod mounting holes with which you can vary the amount caster changes during suspension compression.

Look carefully at the inclination of the steering kingpin. In this photo, the kingpin has about 3 degrees of caster when the suspension is fully extended.



When the suspension is compressed, the kingpin has about 0 degrees of caster.



MAKING CHANGES

Because the RCS front suspension is so adjustable, you can set the rate at which the caster changes simply by increasing the angle of the top arm. You can also adjust the camber angle so that the front tires wear evenly, and this makes your tires last longer.

You can change the amount of camber gain/loss that occurs as the suspension is compressed by placing spacers under the inner ball joints on the front suspension. To kill some of the steering sensitivity, shim up both inner ball joints; to increase the Reactive Caster effect, shim only the rear inner ball joint.

To fully understand the RCS front suspension and to know the effect each change will have, take the time to read the instruction manual carefully.

Though we've already established that the EV10ss's batteries are on its left side, the chassis also allows you to place the cells more toward the center of the car, or more toward the outside. You might want to mount the batteries on the outside if you run the car on a flat oval track. Mounting the batteries on the inside might be the hot setup when you run on a track that has high, banked turns.

Additional differences between the EV10 and the EV10ss include an adjustable wheelbase (in the form of different sets of front-suspension mounting holes) and offset rear-pod control links, which actually change the left- and right-side wheelbase slightly during cornering.

MANUAL DEXTERITY

Some would say that a racecar is only as good as its instruction manual, but in the case of the EV10ss, I don't agree: I think that the car is better than its instructions. If you have a good memory, then you probably remember that when we reviewed the standard EV10, the manual received high marks. It's still a good manual, but the EV10ss should come with a new one. A supplement sheet is provided, but I found building the car slightly confusing. You have to go through the EV10's photo instructions, and then through the written instructions, and mark the text and photos that are different so you'll know when to refer to the supplement.

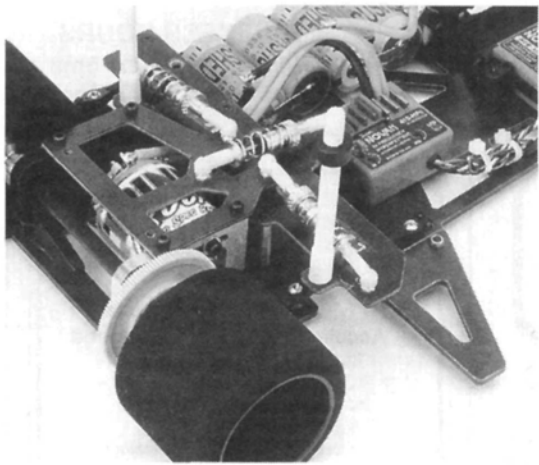
BUILT FOR SPEED

All the main parts come in one bag. Inside the large bag are five sub-assembly bags (each organized for a particular step of assembly), and a bag with diff lube and shock oil.

The kit's graphite chassis and parts are of the very highest quality—no frayed edges to give you splinters. Lightly sand the edges of all the graphite parts, and coat the outside edges of the graphite with superglue, which will strengthen the parts and prevent the graphite layers from separating.

As previously mentioned, the front suspension is Trinity's RCS design, but on this car, the main plate is narrow. The RCS suspension simulates a double-wishbone design that uses a fixed lower arm and a pivoting upper arm. You can change the inclination of the kingpin, because you can adjust the length of each "leg" (link) of the upper arm.

By altering the mounting position of the front link (or by shimming up the rear link's inner mounting position) you can set the suspension to reduce the caster angle during compression. Damping is



Trinity's Triad rear-suspension system adorns the rear of the EV10ss. The middle shocks regulate the fore-and-aft movement of the rear pod, and the two side shocks control the side-to-side action.

provided by kingpin-mounted coil springs and by coating the pins with silicone fluid.

For smoother action, I had to ream the kingpin bushings with a 1/8-inch drill bit, and I had to cut about 3/8 inch from a pair of turnbuckles (the rear link), because the short ones specified in the instruction supplement weren't in my kit. I also added a washer to the top of the upper ball support to prevent the kingpins from rubbing the inside of the wheel. You might want to trim the nylon nuts that hold the suspension plate to the chassis, because they prevent the front suspension from attaining full travel.

The rear suspension is a narrow version of Trinity's Triad system, in which the rear pod is attached to the main chassis by

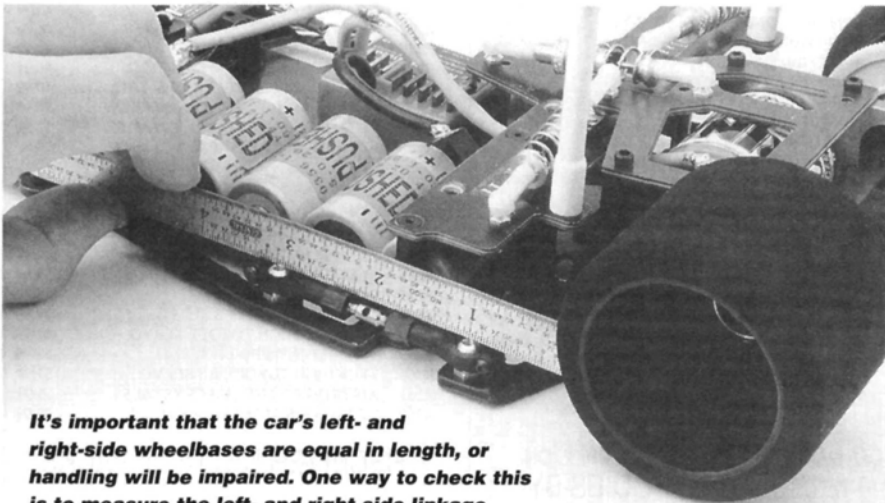
base during cornering.

Three aluminum-bodied, pressurized shocks provide damping for the entire range of the pod's movement. These tiny shocks give the damping action of much larger units at a fraction of the weight.

A graphite rear axle supports a pair of aluminum hubs and the adjustable ball diff. The diff uses a Magic Motorsports spur gear that actually locks the pressure washers in place so you can remove the complete assembly when it's maintenance time—no lost balls here! The kit also includes a selection of molded inserts with which you can adjust the car's rear ride height.

(Five different settings are possible.)

The instruction supplement doesn't show where the rear-pod control-link balls should be placed on the main chassis. To figure this out, I studied the supplement photos to find that the right ball goes in the second hole from the outside, and the left ball goes in the outermost hole. I also found that my kit came with too many long ball ends: I needed more short ones to use in the rear pod's top plate, because the long ball ends interfered with the suspension. To correct this, I installed the long ball ends, secured them with the retaining nuts, and then ground the ball ends flush with the nuts. Even if your kit has ball ends of the proper size, you might want to try the method I used.



It's important that the car's left- and right-side wheelbases are equal in length, or handling will be impaired. One way to check this is to measure the left- and right-side linkage.

a single, centrally located pivot ball that permits unidirectional movement. The task of keeping the pod "square" with the rest of the chassis falls to a pair of adjustable control links. On the standard EV10, these links are symmetrical, but on the oval car, they're offset to alter wheel-

ROAD TESTING

I figured that by using a familiar tire setup on the EV10ss, I would quickly be able to tell how it performed as compared with my other cars. I've been using Jaco* tires and wheels on my other oval car with

(Continued on page 88)

TRINITY®

Spring into Action

Which spring should I use on my motor? It's an often-asked question, with no absolute answer. But here are a few pointers to get you headed in the right direction.

In general, the spring that comes on the motor when you buy it is fine for most uses. There may be times, however, when the supplied spring is not correct, or you might just want to try some experimenting. Here are some suggestions:

1. The more current your motor draws and the more rpm your motor develops, the stronger the spring you will require. Low current applications such as 1/12 scale will use lighter springs because of the low average current. One-tenth-scale roadcourse racing may use a medium-heavy spring, while 1/10 oval might use a medium spring.
2. Brushes' grades also affect spring selection. Most silver-compound brushes can use lighter-tension springs than their copper-only cousins.
3. The size of the brush contact area also affects what spring you might use. With a half-cut brush, you can use half the spring tension and still get the same contact pressure per square inch—with one-fourth the friction.

Try these; they're what we use:

- **RC-4032** Light—for 1/12 scale and 1/10 oval
- **RC-4028** Medium—for 1/10 roadcourse and 1/10 off-road
- **RC-4033** Heavy—for 1/10 off-road and drags (6 to 10 cells)
- **RC-4492** Extra Heavy—for drags (12 to 28 cells)
- And don't forget those comm drops! (**RC-4040**)

Until next month, just spring in there!

Neal McCurdy
Trinity Team Manager

ADVERTISEMENT

The edges of this tear-away section were fogged with candy blue and candy purple and then sprayed with the black webs. Again, white was used as a backing color.

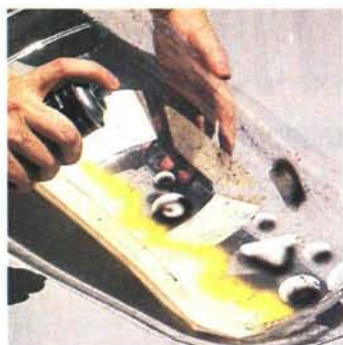


I first noticed the cob-webbed effect on a Schumacher car that was featured in the December '92 issue of *Radio Control Car Action*. It was custom-painted by Richard Muise, the Motion Graphics* paint guru. I studied the photos for hours, but I couldn't figure out how the heck he achieved that look. I finally called Richard and asked him about his "secret" new technique. He said that he and Coverite were currently developing a "can-o'-cobwebs." It sounded intriguing!

The webs in Coverite's Body Shop Cobweb spray paint are actually thin strings of specially formulated paint that are sprayed

Black and purple cobwebs are sprayed behind some masked-off geometric shapes. When they're finished, these webs will give the illusion of depth to the paint scheme by adding a visual "layer" between the floating shapes and the surface.

After you've fogged around the edges and applied white highlights, spray a few webs into your geometric shapes; they'll look like polished stones.



YOU'VE PROBABLY seen the ads for Coverite's* new "cobweb" spray paint by now, and if you're like me, you're curious (and maybe just a bit skeptical) as to how a normal-looking spray can makes that wild, splattered web effect. Well, believe it or not, it works. (And, yes, it really is easy!)



Coverite's new "cobweb" spray paint is available in four colors: black, neon pink, neon green and purple. This is how each looks on a piece of yellow poster board.

**LEXAN
BODY
SPECIAL**

Paint Tricks in a Can

COBWEB



Try applying cobwebs between a candy color and its appropriate backing coat (usually metallic gold or silver).

under high pressure. I thought the unique, oval-shaped nozzle created the webs, but when I put the nozzle on a regular can of spray paint, it produced a normal, even pattern.

One coat of candy red, a shot of black cobwebs and a gold backing coat produce this subtle, rich effect.

The webs spray in a random pattern that you can vary by moving the can closer or farther away from the car. (As you move farther away, the web pattern will be looser.) The webs will just "float" onto the surface of the car. The backing coats should take care of any webbing that hasn't properly adhered to the car. As the instructions state, a distance of between 12 and 18 inches gives you the best results. Practice on a piece of scrap Lexan first!

Coverite currently offers cobwebs in black, neon green, neon pink and purple. The black webs are the most opaque of the batch, and as a result, they show up well over or under almost any other color. The neon pink and green webs are almost transparent, and they work best when they're backed with a lighter color, such as yellow or white. I've tested the compatibility of Coverite cobwebs and several other brands of paint, and I've found no problems, especially if the cobwebs dry for a few minutes before you spray paint over them. It would be nearly impossible to completely paint a car body with just cobwebs, and the desired effect would be lost. You'll definitely need to spray on (don't brush) several light coats of a contrasting paint, so plan accordingly.

On this Dahm's* Pro Stock hood, Pactra's* fluorescent red was "fogged" around the edges, and pink cobwebs were sprayed onto the rest of the panel. Then a white backing coat was applied. The pink webs are very light and work best with the white backing.



Coverite does you right!

If you edge an area with the same color as the webs, it appears as though the webs are clinging to the borders.



If you edge the area with the same color as you use for a backing coat, the webs will stand away from the edges.

For a textured look that's almost "organic," incorporate a few cobwebs into some floating geometric shapes. Use cobwebs beneath your floating shapes (in the main body color of the car), and they'll create the illusion of even more depth. This introduces another dimension into the paint scheme (beneath the floating shapes, but above the "surface" of the car). The shapes will look as if they're floating even higher off the car!

Try adding some cobwebs into a flame paint scheme so that the cobwebs trail after the flames and look like wisps of smoke. For a subtle, rich effect, spray some black cobwebs between coats of a transparent candy-color paint and silver or gold backing coats. What you can do with Coverite's cobwebs has yet to be fully explored. We've only begun to experiment!

WEB SLINGIN'

Now that you know how the stuff works, let's get into some of the best ways to incorporate webs into your next paint scheme. If the uncontrolled, paint-flyin'-everywhere, Jackson-Pollock look is what you're after, mask all the windows first, then combine cobwebs with different-color splatters flung on with a cotton swab. Back the entire body with a contrasting solid color.

If you want to confine your webs to a smaller area, try "fogging" around the edges of the area with the same color as your cobwebs. For example, fog pink around the edges of a panel, then spray the panel with pink cobwebs. Back the entire panel with yellow or white. This will look as if the cobwebs are thicker around the edges and thinner in the center.

If you fog the edges of the panel with the same color that you use to back it *before* you spray on the different-color cobwebs, the webs will fill the center, but they'll "stand away" from the edges without touching them at all.

* Here are the addresses of the companies mentioned in this article:

Coverite, 420 Babylon Rd., Horsham, PA, 19044.

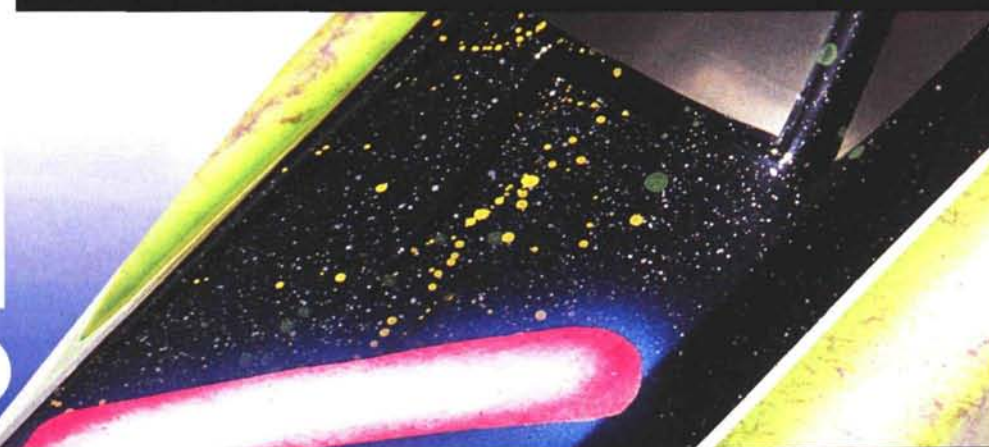
Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21157.

Dahm's Racing Bodies, P.O. Box 360, Colton, CA 94931.

Pactra Inc., 620 Buckbee St., Rockford, IL 61104.

Protoform, 537 Niagara St., St. Catharines, Ontario, Canada L2M 3P6.

The ol' cotton-swab splatter technique is combined with green and purple cobwebbed side panels on this new Protoform* buggy body.



by MIKE OGLE



HOW TO

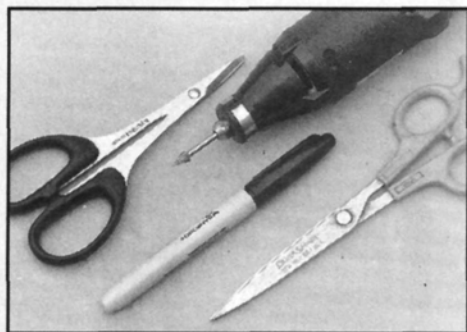
Mount Lexan Bodies



BODY ENGLISH

by MIKE OGLE

NEXT TO PAINTING, trimming and mounting a car's body is one of the least-liked parts of building a car. Racers who spend countless hours "dyno'ing" their motors and tweaking their chassis frequently rush through the body-mounting stage, and then they wonder why the car handles "funny" at speed. A good, straight body-mounting job is critical to making the body's aerodynamics work properly. And, as you'll see, there's really nothing to body mounting if you have a plan of attack worked out ahead of time.



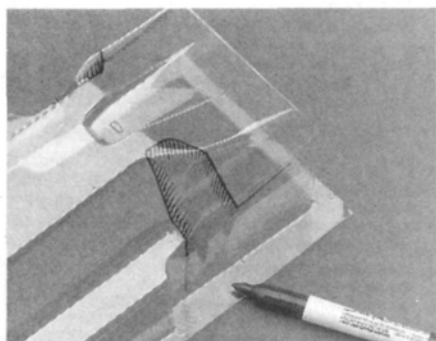
So...prepare to ATTACK!

A pair of curved Kyosho Lexan scissors and a Dremel tool with a coneshaped rotary cutting bit are very useful for trimming and mounting bodies. I usually do most of the trimming with the Kyosho scissors, but when the areas to be trimmed become very narrow (such as at the very top of the shock-tower cutouts), I use the

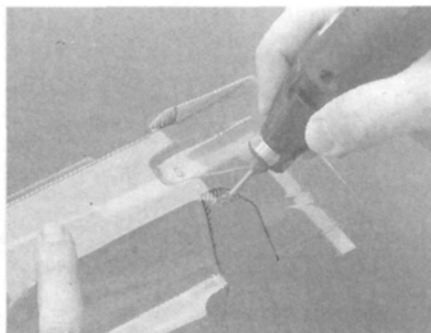
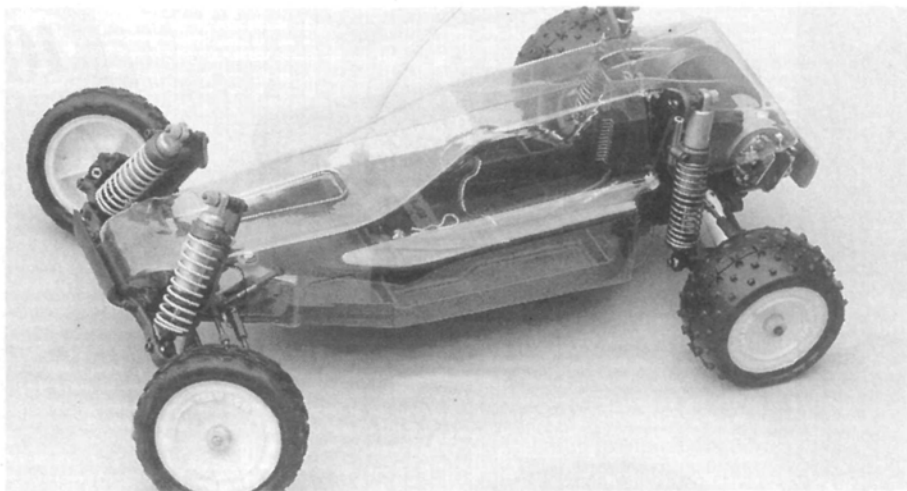
Dremel. A pair of straight-blade scissors makes trimming the lower body lines easier.

If possible, trim and mount your car's body before you paint it. Since you'll be able to see what you're doing much more easily, the task will be about 300 times easier, and test-fitting won't scratch your new paint.

Mounting Off-Road Bodies



1 The biggest problem in mounting an off-road, buggy-style body is with its rear shock tower. To clear it, a lot of the body has to be cut away. Most bodies have some indication of what areas have to be cut away scribed into the mold, but you may need to custom-fit your trim job, especially if you've modified your suspension. You can use a fine-point Sharpie marker to outline the sections you plan to trim, and the marker will easily wipe off with denatured alcohol later.



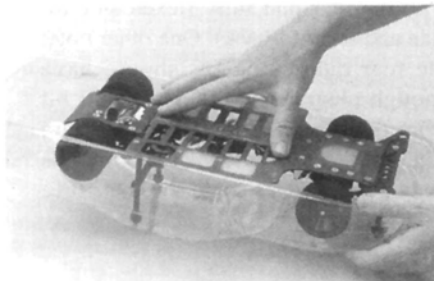
2 Start trimming with the curved Kyosho scissors until you get to the tight areas. Then, mark the areas where you must trim further, and use the Dremel or a comparable tool to gradually enlarge the cutouts until the body fits easily over the chassis. Do it slowly and test-fit frequently. You can always trim more off, but adding it back on...well, that's not so easy!

PHOTOS BY MIKE OGLE

On-Road (Full-Bodied) Cars

IN GENERAL, mounting a full-bodied car, such as a NASCAR stocker, is relatively easy. With a full-bodied car, the body usually fits over the entire chassis already, and the main challenge is to drill the body-post holes in the right places. If possible, lower the body posts so the body sits about as low over the chassis as you want it to actually be. The taller the body posts are, the harder it's going to be to position the holes correctly.

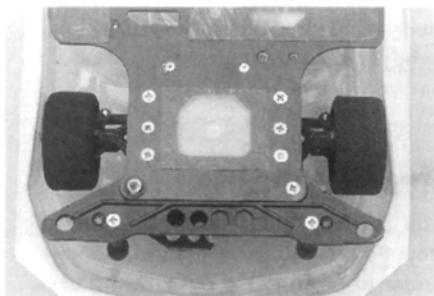
The Turtle Method



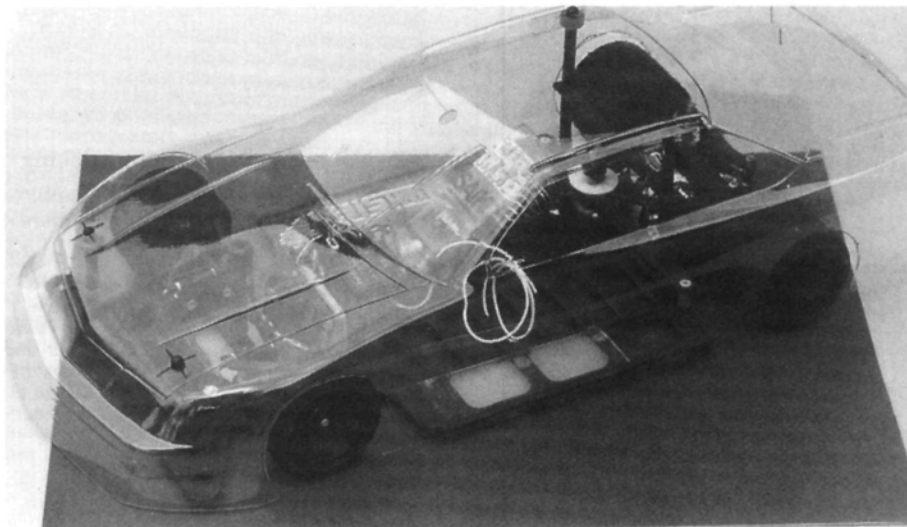
1 Turn the body upside-down and place the car's chassis (wheels on!) into it.



2 Then, eyeball the chassis' side-to-side position in the body...



3 ...and make sure both of the front wheels are centered exactly in the front wheel wells. This is the most critical part of the whole procedure, so be sure that everything sits squarely in the body, then reach underneath and make an "X" with the marker where the body posts touch the body.



4 Flip the body over, and drill under-sized holes in the middle of the two front body-post locating marks. Make sure that the holes line up with the body posts, and if necessary, "scooch" the holes around. Then, when everything is aligned, drill the holes until the body posts fit snugly.

Repeat the procedure for the rear body-post holes, and then enlarge all four holes slightly until the body just "falls" onto the posts without binding. This ensures that the body won't put any stress on the chassis through the body posts. The body should just "float" until you get the body pins in. If you start up front and then take care of the back later, you reduce the likelihood of critical alignment mistakes that could position the body diagonally on the chassis, like a '72 Nova that "crabs" down the road sideways because it has been in one too many fender-benders.



5 After you've drilled the body-post holes, you must make a hole for the antenna mast. Locate the antenna-mast mount from straight above and mark its position on the body. Again, drill a small hole at first, and check the alignment before you enlarge the hole. One trick I've learned is to temporarily install a very short (about 3 inches) antenna mast that reaches only to the spot where you'll need to drill.

HOT GRAPHICS

INSIDE APPLICATION FOR CLEAR BODIES



Inside Stick HOT NUMBERS

Flames, seismic and wet paint are just a few of the designs available in both inside and surface applications.

- TESTED FUEL PROOF
- ASSORTED COLOR SCHEMES
- QUICK & EASY APPLICATIONS

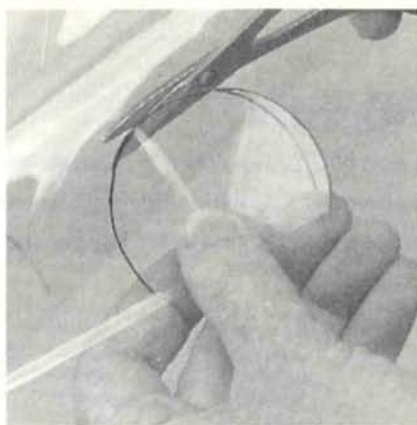
Customizing your R/C has never been easier... it's as simple as CUT, PEEL and STICK. Dumas/Eagle combines hot graphics, state of the art materials and the ease of peel and stick application to give your machine the look that sets you apart.

So whether it's asphalt, dirt, water or air, get there faster than anyone else with

DUMAS/EAGLE
R C GRAPHICS

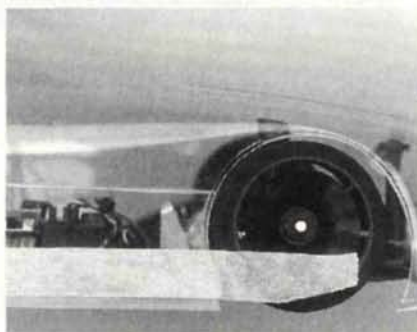
Get 'em at your local hobby shop or direct from Dumas. Call or write for a color catalog.

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Tucson, Arizona 85719
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6 Now—with everything sticking up through the body that's supposed to—adjust the body-post collars to their proper ride height and trim out the wheel-well openings with the curved Kyosho scissors.

Ground Effects



8 Finally, using a strip of 1/2-inch-wide masking tape as a straight-edge, trim the bottom of the body until you have the necessary amount of ground clearance. Once again, proceed in small increments. You can always trim off a little more, you know! How much clearance is enough? Well, it depends on how much suspension travel your car has, how smooth the track is and how flexible your body is. I know that there are a lot of racers out there who like to run their bodies as low as possible—even to the point when you can hear them repeatedly "ticking" the track as they go by. As if it's not enough of a challenge to displace air, they have to try to displace a little asphalt with it, too!



7 If you want a guideline, trace around a similar-size rear tire. With the suspension fully compressed, the front fenders should just clear the tops of the front tires, and the rear fenders should clear the rear tires (even with the rear pod fully flexed side-to-side and front-to-back). One other note: the rear quarter-panels should have enough clearance to take a small hit from the rear and not drive the sharp edges of the body into the foam tire; the body's sharp edges could shred the tire.



9 Finally, if your track's rules allow, cut out the rear panel of your body, leaving the rear quarter-panels intact and enough body across the top to allow a spoiler to be attached if you need one. I know this doesn't do much for the scale appearance of the car, but it really allows air to escape, and most racers find that this is a tremendous aerodynamic advantage.

Final Thoughts

You can use most of these steps to mount a pre-painted body, too; it's just harder to position the body-post holes. Try using a dot of white-out on top of each body post to mark its position on the inside of the body.

Once again, be patient, and remove Lexan in small increments—not big whacks. And if somebody actually *does* know a way to "add it back on," please let me know!



**Mugen
mayhem!**

SUPER SPO

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NITRO-POWERED racers aren't quiet, and they aren't timid. They don't make little whiny sounds; they scream. They don't just stir up a little sand; they blow doors. We're not talking about little living-room toys, or cheap driveway playthings here. Nitro is big; it's bad; it's noisy; and it's in your face!

Just when you think it can't get any bigger or better, nitro pops up where you least expect it. Racing trucks are all the rage in the United States, and 1/8-scale nitro buggies are very popular in Europe and Japan (and getting that way here). So, why not blend both into a killer new nitro? Enter Mugen[®]—manufacturer of world-class, 1/8-scale, 4WD buggies, e.g., the Super Sport '93. The concept is simple, and it has been

used many times before, but never in 1/8-scale gas: take a proven chassis, such as the Super Sport, and convert it to a racing truck—the new Mugen Super Sport Toyota pick-up.



PHOTOS BY ACTIONTRAX

TRICK TOYOTA

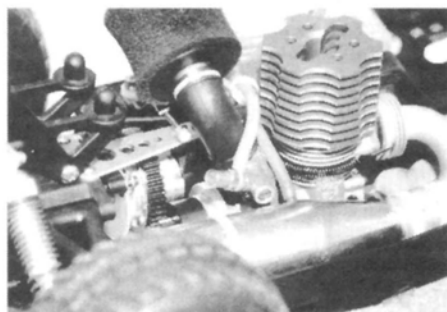
When the truck arrived, I was struck by how scale the whole package looked. A molded front undercarriage, side mirrors and a complete interior roll cage make it look authentic. In a photo with no perspective, it could easily be mistaken for a full-size Toyota team truck that's ready for action at the L.A. Coliseum. Although there's no organized class for 1/8-scale racing trucks (yet), the Mugen Super Sport Toyota is clearly built for racing. Its high-performance features read like a Ferrari window sticker, but the kit is also designed to attract nitro novices. Except for the engine, the radio equipment and a few basic finishing

by JEFF BRONSTEIN

RT TOYOTA

touches, the truck comes nearly 90 percent assembled. That's right; no complicated building is required. When it's time to rebuild or fix the truck, an excellent set of instructions and an exploded diagram of the entire truck show the way.

Because I'm a perfectionist, I first disassembled the truck to see how it was built. The foundation of the truck—the chassis—is a very thick, protective aluminum plate with molded dirt guards on both sides. Front and rear molded bulkheads house very smooth, steel, planetary-gear-type differentials. The shaft drive delivers the 4WD power from a center diff, which is of the

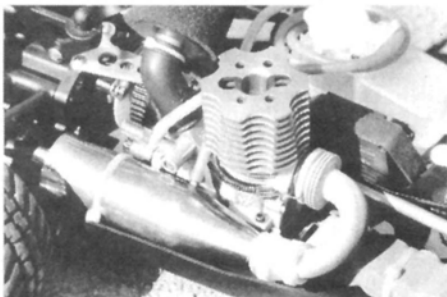


The center differential and disk brake are mounted toward the rear of the chassis. The large, single, fiberglass disk brake provides ample braking power for both front and rear tires.

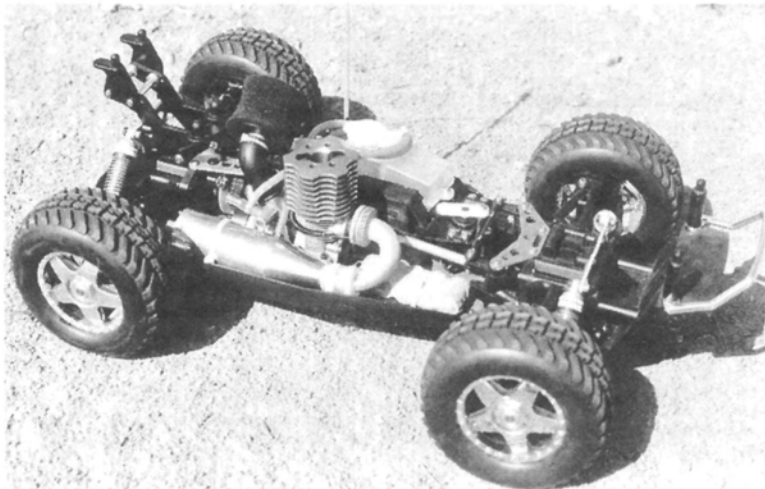
same design as the front and rear differentials. A single, large, fiberglass disk brake attached to the center diff provides excellent stopping power for both front and rear tires.

Unlike many other 1/8-scale buggies, the center differential is toward the rear of the truck. This means that the engine is turned 180 degrees with the exhaust outlet facing forward and the pipe to the rear. Although I can't say that this variation makes any difference, the engine seems to be well-placed for weight purposes.

The SS truck's 4W independent suspension is very rugged and tunable. Upper and



The engine, the manifold and the pipe are nestled on one side of the chassis, while the radio, servos, and fuel tank are on the other. Make sure that the battery wire doesn't rest on the center shaft; it could interfere with radio transmissions.



SUPER SPORT TOYOTA

Converting a proven buggy chassis to a truck has been done before, but never in 1/8-scale gas off-road. The Super Sport chassis has made the transition well.

MUGEN SUPER SPORT TOYOTA



Scale 1/8
Price \$549.99

DIMENSIONS:

Overall length 17.5 in.
Width 12 in.
Wheelbase 12.625 in.
Front track 10 in.
Rear track 10 in.

WEIGHT:

Gross (dry) 7 lb., 8 oz.

BODY:

Type Toyota stadium truck
Material Polycarbonate

Chassis:

Type Pan
Material Aluminum

DRIVE TRAIN:

Primary Spur/pinion/clutch
Transmission Gear
Differential(s) Planetary gear
Bearings/bushings Ball bearings

Brake(s) Single center disk

SUSPENSION:

Type (f/r) Upper/lower A-arm
Damping (f/r) Oil-filled, coil-over shocks

WHEELS:

Type (f/r) Chrome-molded spoke
Dimensions (DxW) 3 x 1.6 in.

TIRES:

Front/rear Scale tread truck

ENGINE/PIPE:

Engine type21 (not included)
Manifold Mugen 180-degree (short)
Pipe Mugen (non-comp.)

OPTIONS TESTED:

O.S, RX-B .21, Airtronics CS-2P transmitter, Airtronics standard FM receiver, Airtronics 94738 and Pro Series 94152, Sanyo 600mAh receiver pack, Nova Rossi* dual-element air filter, McCoy* no. 9 glow plug, O'Donnell 20-percent racing fuel.

HITS

• Killer scale looks and performance • Proven chassis design • Adjustable engine mounts • Twin servo-saver • Good support

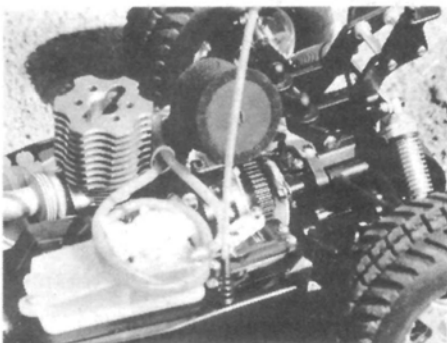
MISSES

• Exhaust hits rear tire • No front/rear brake bias • Needs foam tire inserts • I don't have nine friends with Mugen Toyotas who can play with me.



These unique progressive-rate springs soak up all the bumps that this Toyota terror can find.

lower A-arms are beefy enough for just about any terrain. The front suspension also has a small rod between the arms that prevents them from becoming disconnected under severe stress. Coil-over shocks on all four corners include excellent, large-volume, aluminum body shocks with unusual progressive-rate springs (which means the spring rate increases more as the spring is compressed). Unfortunately, the kit does not include a stabilizer bar, but one can easily be



The center, front and rear differentials are the steel planetary-gear type, and they're extremely smooth.

ordered from the Super Sport's parts list.

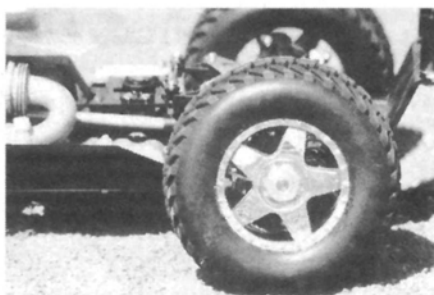
The steering on the Mugen truck is unique and very efficient. Separate steering servo-savers isolate the left and right front tires from the steering linkage. The servo-savers are connected with a tie rod, which is then connected to the servo arm. A jolt to one tire is absorbed before it reaches the steering mechanism and the other tire. Linkages from the steering bellcrank to the wheel carrier also are designed to minimize bump steer.

Overall, Mugen's transition from a car to a truck has been successful. The Super Sport chassis lends itself well to the new truck layout, the scale tires and the chrome spoke wheels. The realistic racing body and its

excellent detail are the icing on the cake. Except for a slight problem with the rear differential alignment, which is easily fixed with a small shim, the kit is very well done.

TRUCK ON TRACK

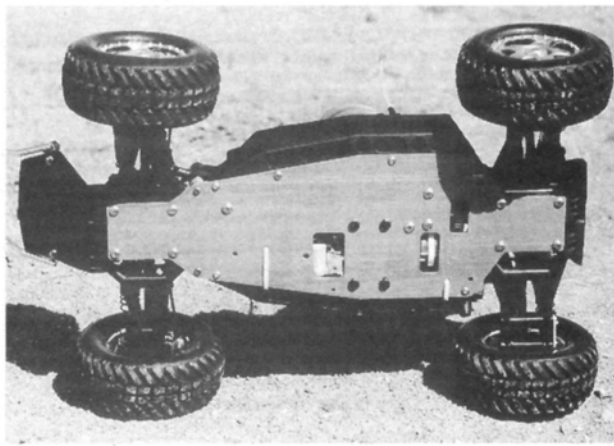
Once I had re-assembled the truck, it didn't take long to get this baby out of the box and into the dirt. Before installing the engine and the radio gear, however, I sent the Toyota body off to Scot Bich at Bich 'n Bodies*. I asked him for a semi-



Scale tires and chrome spoke rims add substantially to the scale appearance and performance.

scale-looking paint scheme in the popular neon colors. As you can see from the photos, Scot doesn't usually disappoint his customers.

It took me about 30 minutes to get the truck ready for action. (It should take the average builder about an hour.) It took 5 minutes to mount the flywheel and the clutch assembly on my O.S.* RX-B, which I then mounted on the chassis. Mugen's manifold and pipe (included) slipped into place alongside the engine. It worried me somewhat that, as a result of the engine placement, the exhaust was directed toward the rear tire.



The heavy, thick aluminum pan chassis can withstand the worst treatment, or the occasional miscalculation. Check out the molded side-guards—pretty trick!

Also, I didn't like the position of the battery shield/mount near the manifold, so I mounted the 5-cell, 600mAh receiver battery pack on the chassis and omitted the metal bracket.

It took me about 20 minutes to mount all the radio equipment on the aluminum radio tray, which can easily be removed for maintenance. Airtronics* supplied the CS-2P transmitter/receiver, a standard 94738 servo for the throttle/brake, and a Pro Series 94152 high-torque servo for steering. A heavy-duty servo is highly recommended for steering the oversize tires on this 1/8-scale racing monster. Servos are bolted directly to the tray, and the transmitter is suspended by a large rubber band to isolate it from vibration. Linkages for the throttle/brake are particularly easy to set up because they're close to the rear of the chassis.

The tires and wheels are assembled by gluing the bead to the rim with a little CA. Foam inserts would have been nice, and they're recommended to keep the large tires from becoming deformed under stress. Once the truck was ready for the initial test runs, I suddenly realized that it was far too easy to get into the Mugen SS truck. Gosh, what will happen to all the scary, nightmarish rumors about building gas-powered race cars (and trucks)? With a starter, an igniter and a gallon of O'Donnell's* top racing fuel, it was time to hit the hills. *ActionTrax* was also on hand to catch all the action for video. (Watch for details soon).

Hold on, Nelly! One flick of the throttle trigger and this trick truck is gone! Blazing speed is never a problem in the .21 class of gas racers. They're all fast! Yeah, I always remember why I hung up the sub-C's when I fire one of these babies up. The Toyota looks totally realistic when it scales up a steep, sandy hill in the New Mexico desert. All four tires dig deep for traction, and with just a quick blip on the throttle, I can break the rear end loose to get the chassis crossed-up in the corners—just like the big boys. The proven SS suspension soaks up every little bump, and hang-time over the big jumps seems like a lifetime. Performance like this can transform any vacant lot into a playground—no swing set required.

THE VERDICT

Now that I have your adrenaline pumping, hold on for just a moment before you call the hobby shop. It's nec-

(Continued on page 100)

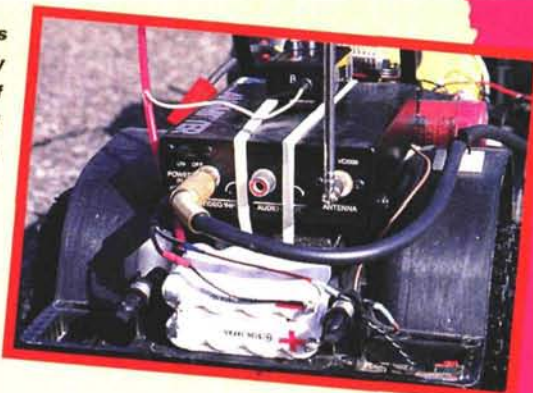
Home Built Project



With the camera mounted inside the windshield, you get a view from the driver's seat.

Vehicular Camcorder

The rear of the chassis sits on the transmitter battery pack. To eliminate the risk of interference from the ESC and motor, I used heavy-gauge video cable to connect the camera to the transmitter.



IMAGINE THAT YOU'RE driving your R/C truck in your house. You crank through the living room and turn into the front hall, where you peg it straight for the kitchen. Ba-bump...you jump the doorjamb to the kitchen and turn for the pantry and the door that leads to the dining room. You zoom right between the legs of the chairs at the table and—ba-bump—another doorjamb and into the living room again.

VIDEO TRUCK

by JOHN HUBER

The Kyosho chassis is perfect for holding the rabbit, the camera, the radio gear and the 32 cells that run the system.



Now, you might think that it's nuts to chase an R/C car through the house: it is! But imagine that you're sitting in the TV room, drinking a soda and driving the car from your La-Z-Boy. With the help of a tiny video camera—made by Supercircuits*—in the truck's front window, it can be a reality. The camera makes you feel as if you're actually sitting behind the wheel while you're driving.

Caught in the Act!

One morning, I noticed that something had been snacking on my bagel before me; I figured that it was either a mouse or a very small Murray Lender. That night, I set a Have-A-Heart trap with a small piece of cheese. I also put a small piece outside the trap to lead him in. The next morning, the piece outside the trap was gone, but the other one was still there. Now I was sure that something was sneaking around the kitchen at night, but what was it? Aha! Video truck to the rescue!

That night, I parked the truck in the kitchen and flipped on a small light. I tuned in the picture with the Rabbit and set the VCR to record. I set the trap again and put it in front of the truck. With everything set, I went off to bed to let the truck do its work.

The next morning, I was disap-

pointed to find the trap untouched, and I figured that there had been no visitors that night. I didn't look at the tape until a couple of weeks later: it



worked after all! About 30 minutes after I had gone to bed, the little varmint came out to play. He popped out by the stove and cruised through the kitchen. I studied the tape and figured out where he was getting in. Now, he'll find the opening jammed with steel wool. Hey, maybe I should try to make a video steamroller to squash the little sucker!

THE MISSION

When the video system arrived, I was totally amazed by the camera's size. Made up of two printed circuit boards (PCBs), it weighs only a few ounces and is only slightly larger than a deck of cards. The two boards are connected with a length of ribbon cable, and this increases your mounting options. There's a small plug on a corner of one of the PCBs that connects the unit to the video transmitter and the power supply.

The camera comes with a set of six

infrared LEDs around its lens for night-vision capabilities, but they drain the batteries too quickly, so I snipped them off. The black and white camera that I tested goes for about \$150. I wanted a spy cam, but I didn't want to spend a lot!

The video transmitter is something you might already have. You've probably seen ads for VCR "Rabbits" that allow you to watch a movie from your VCR on a TV in another part of the house. The Rabbit consists of a simple transmitter that you con-

nect to your VCR and a receiver that you connect to your TV. In this case, I connected the transmitter to the tiny video camera on the truck, tuned in the receiver that was hooked up to my TV, and voilà! The TV gave me a view through the windshield of my Kyosho* Nissan Pathfinder.

On the lower portion of the TV screen, I could see the hood and the body clips; the rest of the screen was a clear view of the room. I sat back and drove through the house, using the view on the tube to guide me. Of course, I recorded the adventure on the VCR. The Rabbit has enough range to cruise my house, but it works best when the two units are within sight of each other. Again, the Rabbit was the cheapest way out. They cost anywhere from \$50 to \$100.



Run, Spot, run! You're on candid camera!

PHOTOS BY JOHN HUBER

POWER SOURCE

Powering this system is a bit of a pain. You'll need two separate power systems for the video system: a 12V source for the camera and an 18V system for the transmitter. The transmitter will work with 12 volts, but it has greater range with 18 volts. I made the 12V pack with 10 AA cells, and the 18V pack with 16 N cells. (The 16 cells actually produce 19.2 volts, but the transmitter has a regulator that limits the voltage to 18 volts.) I tried using two 9V rechargeables, but they only lasted for about 10 minutes because of their limited capacity. The N cells last about one hour. I made four groups of four cells so that I could charge them easily. This also allowed me to mount some of the cells in

Audio and visual signal transmissions are strictly regulated by the FCC (Federal Communications Commission). Technically, using a mini-cam such as the one used in this article is like operating your own broadcast station. Because a video "Rabbit" was used to link the Supercircuits "spycam" to the TV set, however, no FCC license was needed.

A video Rabbit is a short-range device, and

it would be impractical for long-range operation, such as an in-flight camera. If you're interested, an "Amateur TV Kit" is available from Supercircuits. This kit has a broadcasting range of up to two miles, so you'll lose radio contact with your model long before you'll lose the video picture. To use this TV kit, you'll need an FCC "No Code Technician Class" license, which requires a short test administered by the

I want my Am-TV!

FCC. (No code means that knowledge of the Morse Code system isn't required.) This type of license falls under ham-radio regulations.

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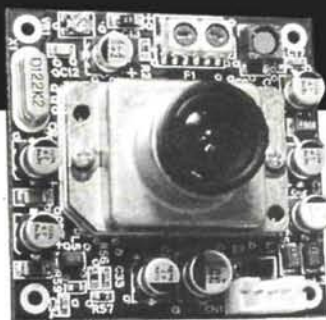
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T. D. Precision Ltd. Ontario, Canada
DEALER ENQUIRIES WELCOME

VIDEO TRUCK

The Latest from Supercircuits



Supercircuits' new PC-7 and PC-3X are the latest in mini-cam technology. The PC-7 is a breakthrough: it's a 2.4-ounce color camera on a flexi-board (similar to the PC-2ex

used in this article) that can be configured as small as 2x2x1 inch. Its features include 350 lines of resolution, a 4.5mm lens (75-degree field of view), auto white balance and auto exposure control.

The PC-3X is monochrome with 240 lines of resolution, and it's only 1 7/8 inches square x 1-inch deep. The PC-7 is available for only \$349.95; the PC-3X costs \$209.95.

one location and the rest on another part of the chassis.

The Rabbit system comes with two AC transformers, so you can plug the receiver and transmitter into the wall, but I only needed one for the receiver.

VEHICULAR CAMCORDER

Kyosho's 4WD Pathfinder is the perfect vehicle for the R/C cam. It's big enough to house all the electronics easily, and it provides a safe place to mount the camera. The video transmitter fits between the rear wheels (case and all) and you can secure it to the chassis with a rubber band. I mounted the camera on the inside of the body so that it points out the front window. The batteries would have been difficult to mount if I had used another vehicle, but with the Pathfinder, there was ample room. I installed the 10 cells for the camera in front of the motor, eight of the cells for the video transmitter next to the motor, and the other eight cells for the transmitter at the rear of the chassis. I wired it all up so that I could turn it on easily with the body in place.

TESTING

On my first trial, I mounted the camera to the left so that I would get a realistic driver's view. The picture looked great, but it was difficult to judge the distance between the right side of the truck and other objects. (In other words, I kept bashing the right side of the truck because the camera was mounted to the left.) I moved the camera to the center of the windshield, and that made a big differ-

ence in the view. I could negotiate chairs and tables with ease!

I got some great effects when I got the Pathfinder up on two wheels. When the truck made a sharp turn on the carpet, I managed to get a couple of rollovers. Boy, did that look cool on tape!

Although I ditched the infrared lights, I found that the Pathfinder's stock set of lights worked great. In fact, I could pilot the truck around obstacles using the light from the headlights alone. When I ran the truck in bright light, however, the picture went white, so I had to wire a switch with a resistor to dim the picture.

CAPABILITIES

The system I tested is as cut-rate as you can get. The camera is black and white, and the transmitters aren't for long-range missions, but the picture is still pretty good. Supercircuits has other video options for more moola. Cameras of higher quality, color cameras, and high-powered transmitters and receivers make flight recording possible for airplane and helicopter pilots. Eventually, I want to get a setup with longer range, and put a camera in an 1/8-scale gas car to see what sheer speed looks like. If you want to add a new dimension to the hobby, give Supercircuits' video systems a try!

**Here are the addresses of the companies mentioned in this article:*

Supercircuits, 13015 Debarr Ave., Austin, TX 78729; (512) 335-9777.

Kyosho/Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826; (217) 398-3630. ■

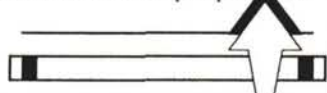
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10L/12L. rear suspension post	\$6.00
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RC10/10T hinge pins-complete set	\$11.00
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Body

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Buyers' Guide



A&L MANUFACTURING

B.T.S. Liberator

This body for Losi's LX-T has an extended cab, rear dirt deflector and durable flared fenders. Trim lines and mounting holes

have been marked for you, and a cut-out rear spoiler is included. Available clear, or painted (as shown) by G. Booker Paints.

Part nos.—9512 (clear), 9512 (painted); **prices**—\$18 (clear), \$49 (painted).

ARE YOU searching for a new look for the car you bought last year? Do you want it to stand out at the track? Or do you want to practice some of the hot paint tricks you've seen in the pages of Car Action? A new body is the answer—and we've got them here!

ASSOCIATED ELECTRICS



Jaguar XJR10 GTP Coupe

The hottest body on the road-racing circuit is the Jaguar XJR10 GTP.

Part no.—6177; **price**—\$18.



Viper Buggy

Associated shows its dedication to off-road racing excitement with this aerodynamic sensation—the single-seat Viper buggy body.

Part no.—6121; **price**—\$14.



Toyota Baja Pickup

Use this off-road Toyota Baja truck body on any RC10

that has been converted into a truck.

Part no.—6174; **price**—\$18.



1991 Pontiac Stock Car

This on-road Pontiac body comes in two versions—regular and narrow—for the Associated RC10L SS car.

Part nos.—6123 (regular), 6124 (superspeedway); **price**—\$18.



Ford T-Bird Stock Car

This '89 Ford stock-car body is for on-road and oval racing, and it fits the RC10 and the RC10L.

Part no.—6170; **price**—\$18.



RC10T Racing Truck

The RC10T is the latest racing-truck body.

Part no.—6122; **price**—\$18.

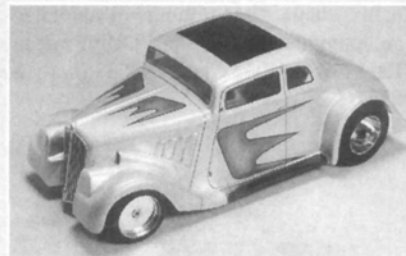
BOLINK



Chevy Stadium Truck

This body is designed for racing, and it will fit most race trucks, including the RC10T and Losi and Traxxas trucks. The Chevy stadium truck's good looks and high quality make it a must for serious truck racers.

Part no.—BL-2317; **price**—\$18.95.

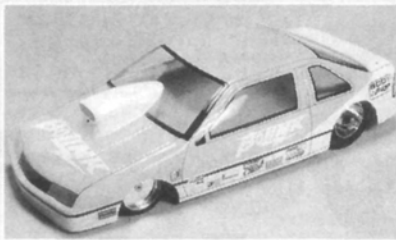


33 Willys Chopped Coupe

This hot, 1/10-scale body is made to fit narrow chassis, including the RC10L SS. Make a cool street rod or drag coupe with it. It has lots of great detail, including a rear parachute.

Part no.—BL-2308; **price**—\$18.95.

BOLINK



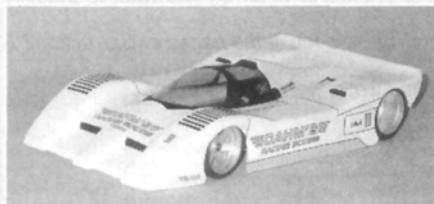
Beretta Pro Stock
Wanna drag? If you do, this new Beretta Pro Stock body is the one for you! It's designed to go straight and fast, and it will fit most narrow cars, including the RC10L SS.
Part no.—BL-2307; **price**—\$18.95.

'93 Lumina
Bolink's '93 Short Track Lumina is patterned after the one that's run on short tracks across the U.S. every week.



Part nos.—BL-2305, BL-2306 (narrow); **price**—\$18.95.

DAHM'S RACING BODIES



Lola GT T92/10 Short Tail

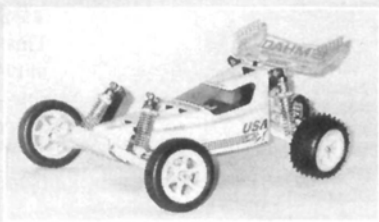
Dahm's new short-tail racing body offers outstanding aerodynamics, realistic styling and fine

detailing. The sleek, low-profile Lola is designed to improve handling and increase top speed on 1/10-scale, standard-width, on-road cars like the RC10L. For additional downforce, the body has a molded-in spoiler, but you can cut this off along the molded-in trim line if you want to reduce downforce. Use the wing with or without the spoiler. The Lola body also comes with vents, a separate GTP wing, decals and instructions.

Part no.—D-050; **price**—\$19.98.

Torpedo

Dahm's Torpedo racing body is designed to hug the frames of the TRX-1, RPM/RC10 and JRX Pro SE. It has a highly effective "air-management system" that has never before been seen on an R/C racing body. Its three front vents direct cool air onto the batteries and ESC; its large roof vent pulls heated air out of the rear of the body. This flow-through system increases running times and top speed. The Torpedo also has a great, aerodynamic shape, wraparound windshield, escape hatch, fine detailing and complete instructions, Dahm's decals, and a super fin wing.
Part nos.—D047 (body), D057 (body and wing); **prices**—\$12.98, \$15.98.

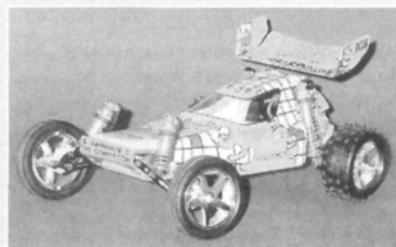


Camino 2000

This futuristic racing-truck body will fit most 1/10-scale cars and trucks, e.g., the RC10L, USA-1, Blackfoot, Super Blackfoot and Clod

Buster. Made of light, strong, .030 Lexan, it has an aerodynamically efficient shape and fine detailing.

Part no.—D199; **price**—\$20.98.



Screamer

Dahm's hot new Screamer racing body hugs the RC10 tub frame so closely that you can mount it with Velcro®-brand fastener! It also fits the RC10 graphite

(using the stock body posts). Its tight fit helps to keep dirt out, and its aerodynamics makes it a winner. It has a wraparound windshield, an escape hatch and a special motor-cooling air scoop. A Thunderbody is also available (part no. D051)

Part nos.—D062 (body), D063 (body and wing); **prices**—\$14.98, \$17.98.



Commando XL

Here's the hottest, most aerodynamic, fastback racing-truck body for the LX-T, RC10T, Nitro Hawk, Stadium

Blitzer, Outlaw Rampage, Outlaw Ultima and Blue Eagle LS. The Commando XL sits much lower on these trucks than the stock bodies do. It has a large hood scoop, two rear scoops, roll bars, rear tarps, an escape hatch, extra-long cab, rear vents, decals, finishing and mounting instructions, a stadium-truck spoiler with mounting hardware and number plates.

Part no.—D198; **price**—\$19.98.

Buggsy

The Buggsy is a fastback racing Bug body for the RC10T and the Nitro Hawk. To help keep dirt out, it fits so tightly that you can

attach it to the sides of aluminum tub frames with Velcro®-brand fastener. The Buggsy also has instructions for mounting it on the Stadium Blitzer, the Clod Buster, the USA-1 and the Outlaw Raider. This lightweight body features super-narrow, aerodynamic, fastback styling, a chopped top, sleek racing fenders, a sunroof and a large "whale-tail" spoiler. It's NOR-RCA-approved.

Part no.—D080; **price**—\$19.98.



Body Buyers' Guide



Firecat

This new, 1/8-scale, single-seat, dune-buggy body is shown on the Inferno. It

features smooth aerodynamic styling, stabilization fins, a wraparound windshield, rear spoiler, an escape hatch, racing wing, front-shock-tower reinforcement fins, and molded-in trim lines (for the Inferno). It's designed to fit the Inferno, Burns, Pirate, and Crono and can easily be trimmed to fit other 1/8-scale gas-powered off-road cars. Dahm's also offers an optional Thunderbody (part no. D052) for the Firecat.

Part no.—D055; **price**—\$22.98.



DAHM'S RACING BODIES



Type L Narrow

Dahm's new 1993 U.S. Stock Car Type L narrow body and under-body are shown on the RC10L SS. This light, .030-inch-thick Lexan body features realistic styling and details and an authentic, adjustable, rear spoiler (mounting bolts included). The Thunderbody's "ground effects" design has air channels that help to increase top speed and improve handling.

Part nos.—D066 (body), D101 (body and spoiler), D127 (Thunderbody); **prices**—\$16.98, \$19.98, \$16.98.



Commando Explorer

This sport-utility racing-truck body fits the LX-T, RC10T, Nitro Hawk, Stadium Blitzer, Outlaw Rampage, Outlaw Ultima and Blue Eagle LS. Its low, narrow profile looks realistic, and its fine detailing, large hood scoop (for shock clearance), sunroof and Dahm's decals finish it off in style.

Part no.—D049; **price**—\$19.98



1993 Type P Pro Stock

Dahm's new '93 Type P Pro Stock drag-racing body features super aerodynamics, fine detailing, molded-in Pro scoop, parachutes and adjustable, bolt-on, pro-stock wing. Made of .030-inch-thick Lexan for lightness and strength, this body is shown with Dahm's Type P Thunderbody on the 1/10-scale Fine Design Pro Stock car. It's an IEDA Nationals winner!

Part no.—D102PS; **price**—\$20.98.

DURATRAX



Lumina NASCAR Narrow

Designed for cars such as the Associated 10L SS, Bolink LTO SS and other narrow-chassis cars, this body is made of 0.030 clear Lexan and has an authentic scale look.

Part no.—DTXC3700; **price**—\$18.95.



'92 Lumina NASCAR

Made of 0.030 clear Lexan, this 1/10-scale body features authentic scale detail and a sleek aerodynamic design. It fits Associated, Bolink, TRC and other popular chassis.

Part no.—DTXC3600; **price**—\$18.95.



'92 T-Bird NASCAR

Designed to fit many Associated, Bolink, TRC and other popular chassis, this T-Bird body with authentic scale detail is made of .030 clear Lexan.

Part no.—DTXC3605; **price**—\$18.95.



Chevy Stadium Truck Body

This 1/10-scale stadium-truck body is made of 0.030 clear Lexan. It's designed to fit the Associated RC10T and the Losi LX-T, and it's also perfect for the DuraTrax gas-truck conversions.

Part no.—DTXC3715; **price**—\$18.95.



'92 Grand Prix NASCAR

This 1/10-scale clear Lexan Grand Prix body has a sleek aerodynamic design and authentic scale detail. It was designed to fit many Associated, Bolink, TRC and other standard chassis.

Part no.—DTXC3610; **price**—\$18.95

DURATRAX



T-Bird NASCAR Narrow

This 1/10-scale, T-Bird, NASCAR, narrow-chassis body is made of clear Lexan. It looks authentic, and it has great aerodynamics.

Part no.—DTXC3705; **price**—\$18.95.



Grand Prix NASCAR Narrow

This narrow version of the Grand Prix clear-Lexan body has the same authentic scale details and sleek aerodynamic design as the standard Grand Prix body.

Part no.—DTXC3710; **price**—\$18.95.

KYOSHO



'93 Lola

This 1/10-scale Lexan body is a licensed replica of the Ganassi team's Target/Scotch Indy car, and it's styled after the brand-new, '93 full-size version. Use it on Kyosho and Tamiya F1 cars. Decals are available separately.

Part no.—KYOC2394; **price**—\$19.95.

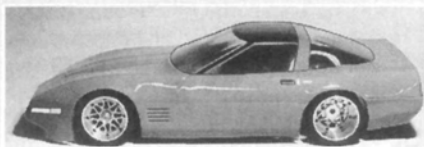
McALLISTER RACING



Stinger with Wing

McAllister Racing's 1/10-scale, off-road, single-seater body for the JR-X2 also fits the RC10. It's very aerodynamic, has 3-D side panels and comes with a separate wing.

Part no.—B131; **price**—\$19.



1992 Corvette ZR-1

This body's accurate details and proportions will put your car in a class of its own. It will fit most 1/10-scale pavement chassis.

Part no.—B-160; **price**—\$19.95.



Nissan 300ZX

Wake up the competition with McAllister Racing's Nissan 300ZX. This IMSA GTO version has flared fenders and snazzy racing trim.

Part no.—B-132; **price**—\$20.



Lumina and Lumina Pro Stock

McAllister Racing introduces the Lumina body and the Lumina Pro Stock body, which has a Pro-Stock aero scoop. Both versions come in wide and narrow.

Part nos.—B-130 (wide), B-138 (Pro Stock wide), B-161 (narrow), B-163 (Pro)



Dakota T

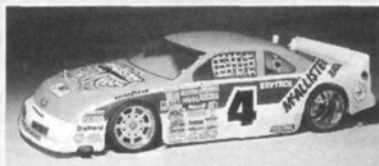
The Dakota T was designed to fit the hot T chassis; it has molded-in number plates and a sleek hood bubble to house its long shock struts.

Part no.—B-165; **price**—\$19.95.

Monster Ford

With the latest in Ford truck styling, this body is perfect for stadium racing, monster-truck bashes, or cruising through the neighborhood. It features cab fairing, a rear spoiler and exposed four-barrel carb.

Part no.—B-135; **price**—\$19.95.



T-Bird Bodies

Perfect for super-speedway cars, McAllister's T-bird bodies offer a scale look and have new, larger, Winston Cup spoilers to make them more stable. Choose from wide, narrow and Pro Stock versions.

Part nos.—B-127, B-139, B-166, B-167; **price**—\$19.95.

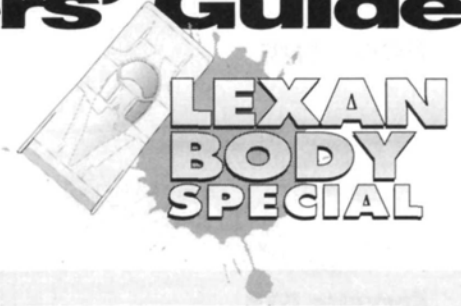
Ironman Toyota Pickup Desert Racer

This is *it!*—the Ironman Toyota Pickup Desert Racer body! From its streamlined Baja nose to its molded-in roll bars and spare tire, the authentic details are all there.

Part no.—B-153; **price**—\$20.



Body Buyers' Guide



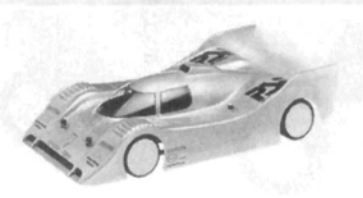
PARMA/PSE



1993 Lumina

This narrow, 1/10-scale '93 Lumina body comes with an adjustable spoiler.

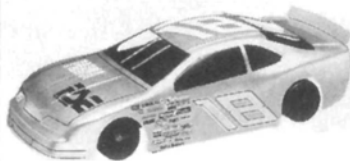
Part no.—PSE 99016; **price**—\$19.95.



1/12-Scale Toyota TS010

This new, clear-Lexan Toyota blends maximum downforce with a low profile, a reinforced nose and a passage that takes cooling air to the motor.

Part no.—PSE 99018; **price**—\$11.



T-Bird

This 1/10-scale, narrow, T-Bird body comes with an adjustable spoiler.

Part no.—PSE 99015; **price**—\$19.95.



1993 Pontiac

This 1/10-scale, narrow, Pontiac body comes with a detachable wing. It's made of clear, light Lexan, and it's great for *serious* oval racing.

Part no.—PSE 99017; **price**—\$19.95.



Toyota Stadium Racer

This new Lexan Parma Toyota truck body is one of the most innovative racing-truck bodies available. Its narrow, sleek, low-profile shape features a built-in wing and a working scoop (on the roof) that directs the air straight to the motor and extends the life of all your electronic gear. It's a direct replacement for the RC10T, but, with Parma body-mounting kits, it will fit other trucks.

Part no.—10370; **price**—\$19.



Ferrari F-40 Body

For all who are interested in true scale realism, Parma offers one of the most authentic reproductions ever! This hi-zoot body has to be seen to be believed! It comes with a separate wing.

Part no.—PARMA 10375; **price**—\$21.



Impulse

This low-profile, 1/10-scale off-road body fits directly onto the Losi JRX-SE. It comes with a wing.

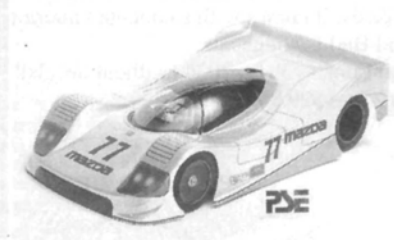
Part no.—PSE 99004; **price**—\$15.



Killer-T

The Killer-T from PSE is a classic in the making. It fits directly on the Associated RC10T, it allows clearance for the new Associated shock tower, and it comes with a spoiler.

Part no.—PSE99010; **price**—\$19.



Mazda RX-792

Patterned after its full-size counterpart, which has revolutionized full-size GTP racing, this beauty is sure to have a future in R/C racing. Its aerodynamically efficient lines produce tremendous downforce and allow it to cut through the air. It's available in 1/10 and 1/12 scale, and there's an extra-long 1/12-scale version.

Part nos.—PSE 99001 (1/10), PSE 99000 (1/12), PSE 99005 (1/12 XL); **prices**—\$19, \$11, \$11.



Slam Jam

Perfect fit, low profile and a free spoiler are just a few of the benefits of this new Slam Jam body for the Losi LX-T.

Part no.—PSE 99008; **price**—\$19.

PRO-LINE



Corvette GTP

The Corvette GTP will help to give your car a clean ride every time. Consistency is the key to this body's performance.

Part no.—3027; **price**—\$19.95.



Jaguar XJR-10 GTP

The attractive Jaguar XJR-10 GTP is made of light polycarbonate. It will add to the appearance and performance of any racing chassis. It comes with a concours interior and Bud Light decals.

Part nos.—3049, 3034 (without decals); **prices**—\$29.95, \$19.95.



'92 Pontiac

If realism is your thing, check out Pro-Line's '92 narrow Pontiac, which comes with a stock-car interior. This innovative design is the latest development in years of R/C racing experience.

Part nos.—3069 (narrow), 3042 (wide); **price**—\$19.95.



'92 Bud Nissan Stadium

This beauty is not only realistic, but it's also aerodynamic and race-ready. The '92 Bud Nissan stadium truck comes with Bud decals.

Part no.—3051, 3021 (without decals); **prices**—\$29.95, \$19.95.



Mazda RX7 GTP

The Mazda RX7 GTP is stylish, sleek and aerodynamically efficient enough to place first in any race. The new wind-tunnel-tested rear wing provides just the right amount of downforce for any slippery track.

Part no.—3008; **price**—\$19.95.



Chevy Sportside

The Chevy Sportside body has a highly developed, thoroughly tested design that will help you to succeed against the toughest competition.

Part no.—3045; **price**—\$19.95.



'93 Chevy Lumina

The '93 Chevy Lumina polycarbonate stock-car body is a missile. It has been wind-tunnel-tested for maximum downforce, and its "ground-effects" nose offers better steering.

Part nos.—3038 (narrow), 3044 (wide); **price**—\$19.95.



Chevy Stadium Truck

The Chevy stadium-truck body is a highly developed, thoroughly tested design that will help you to succeed against the toughest competition.

Part no.—3020; **price**—\$19.95.



Toyota Stadium Truck

The hot, new, low-profile '92 Toyota stadium-truck body fits the RC10T, JR-XT and the LX-T.

Part no.—3023; **price**—\$19.95.



'93 Thunderbird

This narrow '93 Thunderbird was designed to offer superb handling on superspeedways, and it clearly sets new standards for Lexan models. It comes with Bud decals.

Part nos.—3052, 3037 (without decals); **prices**—\$29.95, \$19.95.

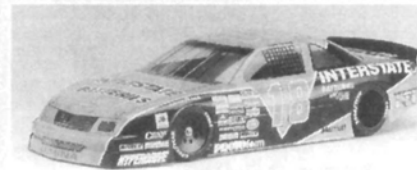
PROTOFORM



Nissan P-35

This sleek new body has an ultra-low profile and a molded-in rear spoiler. Trimmed Lexan side dams and a separate rear wing increase rear stability and give the R/C version the look of the full-size P-35.

Part no.—1402; **price**—\$19.95.



1992 Lumina SS

This racy-looking body has been used by many concours winners. It features molded-in roof and trunk rails, and it comes with a separate rear spoiler.

Part nos.—1202R, 1202L; **price**—\$19.95.

Body Buyers' Guide



The Ripper

Designed for quick, hassle-free installation and removal, this sizzling new body is made for the Losi Pro-SE. It has two air intakes—one for the ESC and the other for motor cooling. Very light and narrow, it fits snugly enough to keep dirt out of the chassis. It's great for serious competitors.

Part no.—1503; **price**—\$15.95.

Isdera

This narrow, purpose-built body is specifically for high-speed oval competition such as the "Insane Speed Run" and similar events at large oval speedways and velodrome-type tracks. The body has a very low drag coefficient and is designed to run without wings or spoilers. It's a unique body for racers who want to go very fast!

Part no.—1902; **price**—\$19.95.

1992 Thunderbird SS

This sleek, clean body has been used on large, high-banked ovals and velodromes by some of the strongest runners in the U.S. It has molded-in roof and trunk rails, and it comes with a separate spoiler.

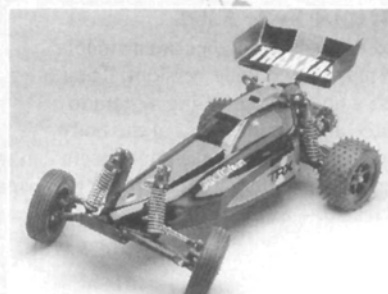
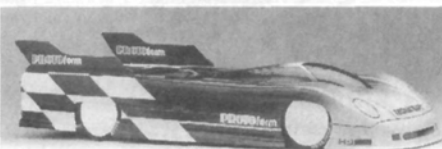
Part nos.—1203R, 1203L; **price**—\$19.95.



Nevada LX-T

Protoform's first entry into the race-truck class is based on the hot new '93 Ford Ranger body style. This high-quality Lexan body fits the Losi LX-T like a glove, and it's bound to be a trendsetter. Its features include: a strengthened rear body-mounting area, a molded-in front valance to keep out dirt, highly detailed body line and add-on rear spoiler.

Part no.—1506; **price**—\$19.95.



Javelin

This hot new body makes the TRX-1 look as racy as it really is. Extremely light and trim, it fits tightly enough to keep dirt out of the chassis without hampering the actions of the components inside. It also has a small air intake that helps to cool the ESC and to strengthen the rear body mount. The already nimble handling of the TRX-1 is enhanced by this sleek body. It comes with a wing and decal.

Part no.—1504; **price**—\$15.95.



1992 Grand Prix SS

This body continues to be one of Protoform's most popular. It features molded-in roof and trunk rails, and it comes with a separate rear spoiler.

Part nos.—1201R, 1201L; **price**—\$19.95.



1992 Regal SS

This popular, Busch-series, short-track stock-car body has plenty of details and a separate rear spoiler; like all Protoform stock cars, it's available in two weights and is NORRCA-, ROAR- and PROCAR-approved.

Part nos.—1205R, 1205L; **price**—\$19.95.



1992 Cutlass SS

This new body style offers a very good "steering feel" on both carpet and asphalt tracks, and it has plenty of details that replicate those on the popular Busch-series race cars. It features molded-in roof and trunk rails, and it comes with a separate rear spoiler.

Part nos.—1204R, 1204L; **price**—\$19.95.

S&K



Losi LX-T AIRS

The S&K AIRS body for the Losi LX-T features a unique channeling system that forces air from the front of the body to the motor heat sink. This system can reduce heat by as much as 30 to 50 degrees and increase the overall performance of your truck.

Part no.—SKLX24; **price**—\$20.95.

Body Buyers' Guide

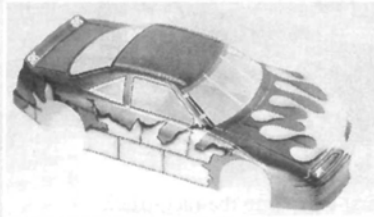
LEXAN BODY SPECIAL

S&K

Grand Prix AIRS

S&K stock-car bodies are available in narrow and wide versions. They use a unique channeling system to force air from the front of the body to the motor heat sink. This system can reduce heat by as much as 30 to 50 degrees and increase the overall performance of your car.

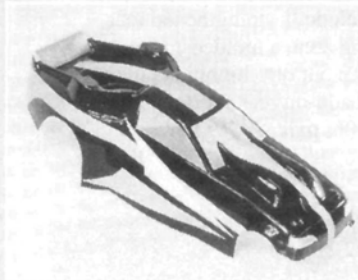
Part no.—SKG33; **price**—\$20.95.



Losi Pro SE AIRS

The S&K Pro SE body is sleek, efficient and eye-catching. You'll be number one in more ways than just winning at the track with the S&K Pro SE AIRS body.

Part no.—SKLC25; **price**—\$18.95.



RC10T AIRS

Whether you're racing at the Nationals or your local track, or just playing around in your backyard, you'll appreciate the true performance and authenticity of S&K's RC10T AIRS (Air Inducted Race System). Each one has a unique channeling system that forces air from the front of the body to the motor heat sink. This system can reduce motor temperature by 30 to 50 degrees, and it can improve the overall performance of your truck.

Part no.—SKTA21; **price**—\$20.95.



'93 Chevrolet Lumina AIRS

This stock-car body looks like the real thing. Whether you're racing or just playing in the driveway, you'll appreciate the unique channeling system that forces air from the front of the body to the motor heat sink; you'll get more run time and greater motor efficiency.

Part no.—SKL23; **price**—\$20.95.

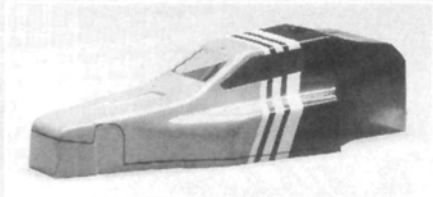


Thunderbird AIRS

This Thunderbird body is available in narrow and wide versions. It uses a unique channeling system to force air from the front of the body to the motor heat sink. This system can reduce heat by as much as 30 to 50 degrees and increase your car's overall performance.

Part no.—SKTN31; **price**—\$20.95.

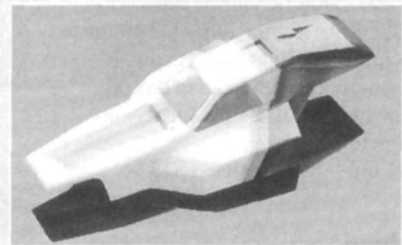
TEAM LOSI



Custom Painted Pro-SE

All Team Losi kit bodies are available custom-painted. Check out the national champion Pro-SE shown here. Each body has beautiful, contrasting candy, solid and Day-Glo colors that will make your vehicle stand out on the track.

Part no.—A-8007; **price**—\$35.



Jammin' Jumper

Jammin' Jay Halsey designed his new Jammin' Jumper Lexan body for the RC10 Team Car to improve its performance and looks. This tough, stylish body has great aerodynamics and more than enough room for the electronics. Like the Jammin' Lambo monster truck body, the Jammin' Jumper is available clear or custom-painted.

Part no.—J-211; **price**—\$35.

Index of Manufacturers

A&L Mfg., P.O. Box 2115, Corona, CA 91718.

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

Bolink R/C Cars, 420 Hosea Rd., Lawrenceville, GA 30245.

Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931.

Duratrax/Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.

Kyosho/Great Planes Model Distributors.

McAllister Racing, 1000 N. Humphreys St., Ste. 204, Flagstaff, AZ 86001.

Parma International/PSE, 13927 Progress Pkwy., North Royalton, OH 44133.

Pro-Line, P.O. Box 456, Beaumont, CA 92223.

Protoform, 5455 S. Western Blvd., Hamburg, NY 14075.

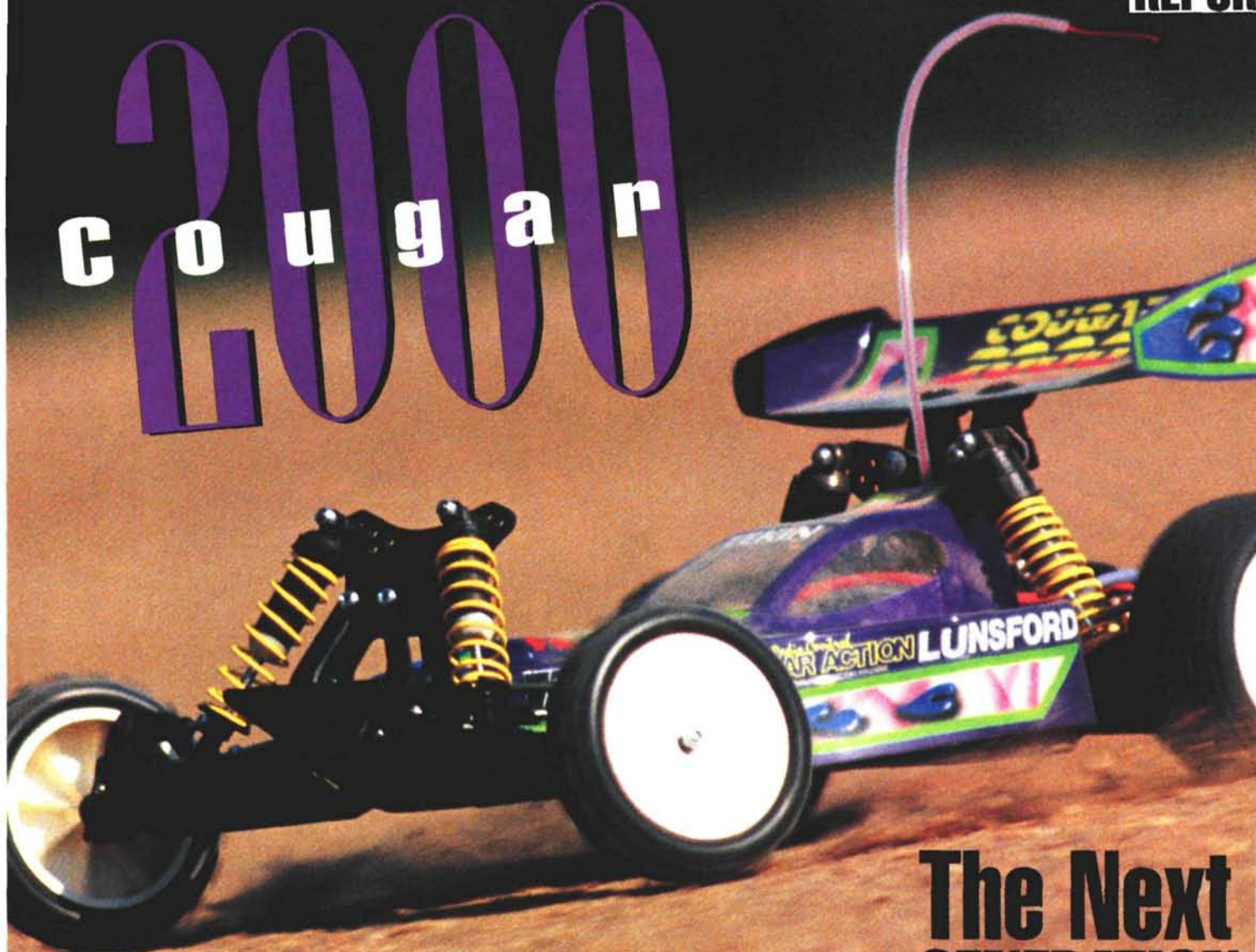
S&K Racing Products, 215 South Market St., Oskaloosa, IA 52577.

Team Losi, 13848 Magnolia Ave., Chino, CA 91710.

S C H U M A C H E R

CAR ACTION
TRACK
REPORT

Cougar 2000



The Next GENERATION

CECIL SCHUMACHER* is, perhaps, best known for his innovative approach and his willingness to try new ideas and designs. The Schumacher design team has developed a 2WD car that they feel represents a step forward in R/C-car design. The Cougar 2000 is the most versatile, innovative car that Schumacher has ever produced. It's so different from the rest of the successful Cougar legacy that it's surprising that it carries the same name. The only things it has in common with previous Cougars are the Pro shock absorbers, the friction clutch and a few threaded fasteners. The Cougar 2000 should

PHOTOS BY JOHN HUBER

be Schumacher's best shot at another World Championship.

ENHANCEMENTS

The 2000 looks nothing like any chassis ever mass-produced by an R/C car manufacturer. Right away, you'll notice its bi-level fiberglass box-monocoque chassis. The upper and lower black fiberglass plates are connected by X-bracing and the front and rear bulkhead members.

This car's chassis configuration has very high torsional rigidity; it closely resembles that of current 1/8-scale on-road chassis.

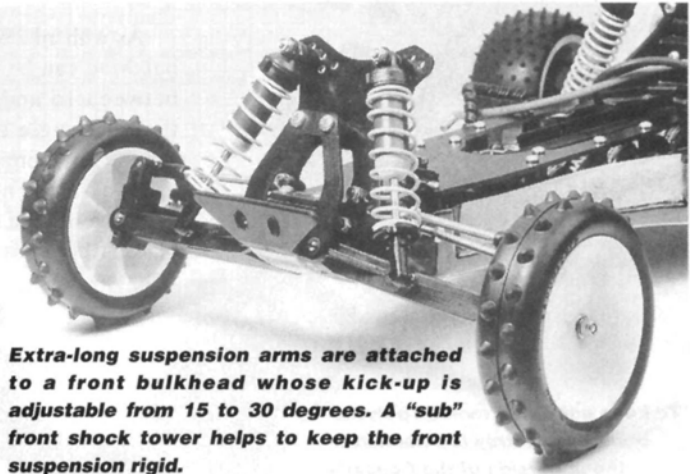
by
GARTH FINLEY

The high torsional rigidity allows the car's suspension to do all the work, so the chassis stores a much lower amount of energy during cornering. (Chassis actually receive and store energy from the suspension, then release it back to the suspension. More energy is stored in a flexible chassis than in a more rigid one.) In theory, the car should feel very consistent throughout the turn. Schumacher also offers optional graphite chassis plates and shock towers that are even stronger and lighter.

The next thing that will catch your eye is the gear-driven transmission. Why, all of a sudden, is it gear-driven rather than belt-driven? The gear-drive provides more rotating mass, which corresponds to a higher amount of angular momentum, i.e., rotating weight, throughout the transmission and drive line. With a belt-driven transmission,

when a car coasts into a tight corner, it decelerates almost to a stop by the time it reaches the apex. Naturally, you apply throttle to get the car through the rest of the turn, and then nail the throttle on exit when the car is lined up straight.

There is one problem with this, especially on slick tracks: when you apply that small amount of throttle at the apex of the turn, you upset the balance of the car and decrease the tire's

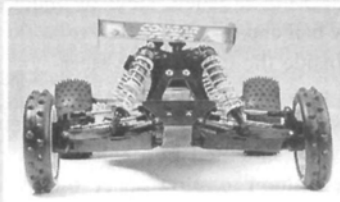


Extra-long suspension arms are attached to a front bulkhead whose kick-up is adjustable from 15 to 30 degrees. A "sub" front shock tower helps to keep the front suspension rigid.

side bite to keep the car rolling through the remainder of the turn. With a gear-driven transmission, you can roll the car through the entire turn without losing much velocity, and you need not apply throttle until you exit the corner (we're talking about tight turns).

The comparison is like saying it is easier to decelerate a lightweight flywheel rather than a heavy one. You need just enough mass to keep the car rolling (coasting)

SCHUMACHER COUGAR 2000



Scale1/10
Type2WD racing buggy
Price\$429.95

DIMENSIONS:

Overall length14.5 in.
Wheelbase10.8 in.
Front track8.9 in.
Rear track8.1 in.

WEIGHT:

Gross (with battery)3 lb., 6 oz.

BODY:

TypeSingle-seat buggy
MaterialPolycarbonate

CHASSIS:

TypeBi-layer monocoque
MaterialFiberglass (G-10)

DRIVE TRAIN:

PrimaryPinion/spur
TransmissionGear drive (2:1)
DifferentialExternally adjustable ball
Bearings/bushingsBearings

WHEELS:

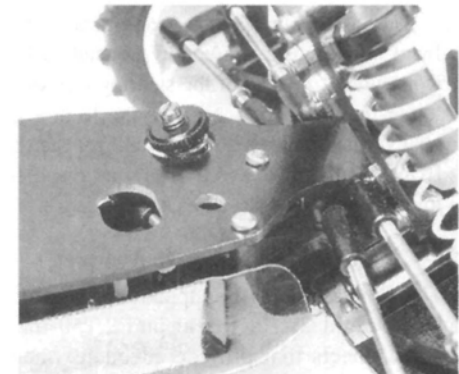
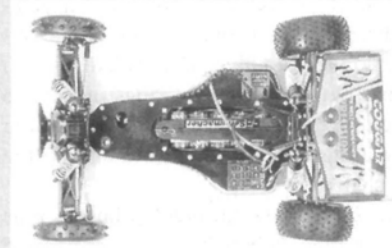
Front: TypeOne-piece molded plastic
Dimensions (DxW)2.15x0.750 in.
Rear: TypeOne-piece molded plastic
Dimensions (DxW)2.20x1.375 in.

TIRES:

FrontTwo-row studs
Rear12-row mini-spikes

ELECTRICS:

Motor, battery, speed controllerNot included



A dual-bellcrank steering system is standard. Steering Ackerman can be altered by changing the center rod's length. The protruding knob shown in the photo allows you to alter the spring tension of the built-in servo-saver.

through the entire turn. When it comes to acceleration and braking, the difference between the two is minute.

The 2000 also has all-new suspension components. The wishbones, bulkheads and shock towers are radically different. Most notable are the extremely long wishbones. They'll allow the shocks to really soak up the bumps on a rough track. A main concern is that when the wishbones are this long, the weight transfer characteristics make the car react a little slower. However, the 2000 has a comparatively short wheelbase, which can be adjusted quickly. The 2000's steering and suspension components are made of

Hits

- The car steers very hard and has an abundance of rear bite.
- Shock absorbers are extremely smooth and easy to build.
- The car is infinitely adjustable.
- The packaging, craftsmanship and moldings are excellent.

Misses

- The price tag is a little high.
- Many adjustments can confuse the inexperienced.

SCHUMACHER COUGAR 2000

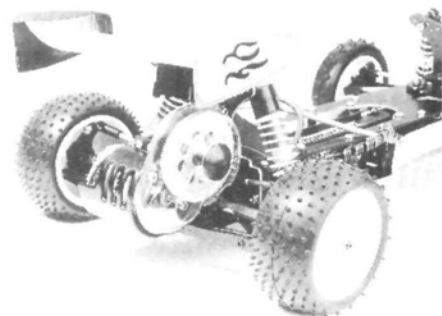
To keep out dirt, a molded polycarbonate undertray is attached to the underside of the Cougar's chassis. Like the front suspension, the rear end uses long arms to smooth out the rough tracks.

Schumacher's Performance Engineered Polymer (PEP). PEP was used with great results on the Cougar II and Cougar II Works cars. These parts are stiff and can withstand a significant impact, and they've been molded to strict tolerances, which makes assembly painless.

The last major changes were made to the front end. Bearings are now housed in the front wheels instead of the steering blocks to lower the unsprung weight of the front end, change the front wheel offset and reduce the front scrub radius. All this was done to improve the car's steering characteristics.

COMPETITION COMPONENTS

The Cougar 2000 is equipped with a set of lightweight 2.2-inch rear and 2.150-inch front wheels that provide adequate wheel stiffness. Schumacher's popular rear mini spikes and two-row knobbed front tires come with the kit in the blue (firm) rubber compound.



The Cougar 2000 uses an all-new gear-driven transmission—not the belt-drive unit that was used on all other Schumacher 2WD cars. The excellent friction slipper clutch is standard.

As with all 2WD Schumachers, the front bulkhead can be adjusted to vary the rake between 15 and 30 degrees. Changing the rake angle can be accomplished in seconds by simply removing two screws and changing to a different set of wedge-shaped molded spacers. A ridged, black, fiberglass shock tower is mounted to the bulkhead and to a sub-shock tower that serves as both a shock-tower stiffener and a plate through which the lower wishbones' hinge pins pass.

Caster can be quickly adjusted between 0 and 15 degrees by changing small inserts that are press fit in the caster blocks. The front suspension is completed with 5-40 threaded, steel turnbuckles and new ball cups.

Inside the chassis, the steering servo and steering system are neatly housed. The steering servo is mounted in a side-to-side fashion to allow space for the new adjustable servo saver (similar to Associated's* 10T) and bellcrank system. A nice feature of the 2000 is that the Ackerman effect can be adjusted on the new steering rack system by changing the link that connects the two bellcranks.

The car's rear section has also been completely redesigned. The long, rear wishbones are mounted very close to each other and extend well into the deep-dished wheels where they attach to the hub carriers. The drive shafts consist of a traditional ball-and-cup configuration at the output shafts and a universal joint/axle system that passes through the bearings in the hub carriers. Red-anodized, aluminum tubing connects these two joints to make up the drive shafts.

The 2000's new differential houses nine 4mm tungsten carbide balls that are situated in a 18mm diameter pattern. A nice feature is that the completely sealed differential comes already built and adjusted to factory specifications. The differential action remains very free at suitable positive setting.

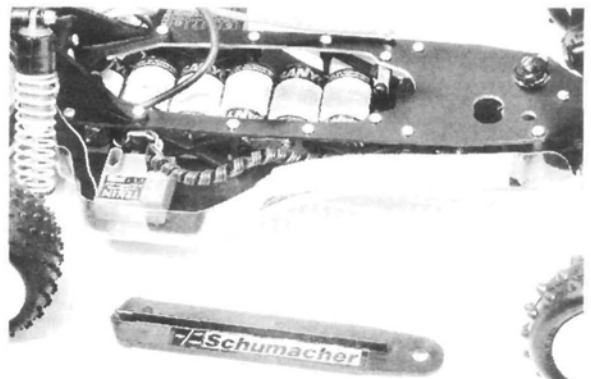
The 2000's ball-raced friction clutch is one item that hasn't changed in design; it has been a proven winner since the debut of the Cougar II. The clutch is consistent owing

to its well-machined, hard-anodized plates, and the polytetrafluoroethylene (PTFE) disk that's sandwiched in between them. It's easy to adjust, and you can change the spur gear without altering the clutch's setting.

Similar to the front caster blocks, the rear hub carriers also allow inserts to be easily changed to adjust the rear toe-in setting. Unlike the other Cougars, the 2000 controls all of its rear toe-in at the hub carrier location and not at the inner hinge pin. This allows the wheelbase to remain consistent under suspension travel.

Both the front and rear wishbones, shock tower, and upper control-link mounts offer many positions to readily alter the roll center, roll stiffness and suspension travel.

The car also uses Schumacher's hard-anodized, Teflon-coated Pro Shock Absorbers. The shocks have adjustable pistons to alter damping, precision-ground, chrome-plated shafts and a volume-compensating rebuildable cartridge that



A rigid spine holds the battery pack firmly in place. The upper chassis plate combined with the molded braces make the chassis extremely rigid.

houses the O-ring seals. The foam section in each cartridge allows the shock to behave more consistently and helps to lower pressurization during stroke displacement. The shocks can be built with a choice of two different types of seals that have different stiction and sealing characteristics.

PUSSYCAT ASSEMBLY

The Cougar 2000 was the easiest and least time-consuming Schumacher car I have ever built. Assembly was also reduced because the diff was already built. This made the transmission a joy to put together. Everything fit as it should, and the instruction manual is superior compared with previous Schumacher kits. Some of the ball cups were a little tight and needed to be worked in before they were completely free.

(Continued on page 100)

RACER NEWS

WORLD • CLASS • RACING

Lemme tell ya chicky babe, many things have been happenin' on the on-road racing scene! First, let's make a stop at the Lake Whippoorwill International Speedway in Florida for the **Paved Oval Nationals** race. Team Trinity was out for blood, plain and simple. TQing the **1/12-Scale Modified Class**, and



Neisinger

setting a new track record was none other than IFMAR World Champ, Tony Neisinger, piloting Trinity's all-new Revolver 12ss. Tony rocked the Whipp with an impressive run of **54 laps** in **5.02.35** minutes. The old record, held by Armond Beckom, was 53 laps in 5.03.89. In the **1/10-Scale Class**, Trinity's "magic boy,"

Joel Johnson, also set a new record, as he drove his Evolution 10 SS **46 laps** around the Whipp in **4.05.39**. Joel beat his previous record of 46 laps in 4.06.10.

In the Modified Class **1/12-scale A-Main**, it was **1/10-scale** polesitter, **Joel Johnson**, taking the win, followed by teammates Tony Neisinger in second, Shane Kocher in third and Mike Blackstock in fourth. Justin Meridith, Jim Dieter, Bob Hall, Jim Fuller, Dave Piehler and Mike Boylan rounded out the top 10 in that order.

When it was time to run the **1/10 Modified A-Main**, TQ-holder Johnson wasn't as lucky. Joel's teammate, Jim Dieter, broke on the track and wasn't able to continue. Unfortunately, the turn marshal didn't know it and set him out on the track directly in front of oncoming traffic and right in front of Joel. Apparently, Joel didn't see

Jim in time, and he hit him at full speed, breaking his car. **Chris Smith** went on to win the race, followed by Jeff Irish, Mike Boylan, Tony Neisinger, Troy Meridith and Shane Kocher. Unfortunately, Kent Clausen, Joel Johnson, Jim Dieter and Craig Carey did not finish.



Johnson

The following weekend at the **ROAR On-Road Nationals**, which should have been renamed the Johnson Nationals, Joel went out with a vengeance and TQ'd the **1/12 Class**. He



The World of On-Road



Smith

won both the **1/12** and **1/10 A-Mains**. According to our own Frank Masi, who witnessed the event, "Joel is about the best on-road driver I have ever seen! It was a real feat for him to pull off a double win at a race like this where the competition is so intense." Look for more on the race in a future issue from contributing author Rick Schwartz.

And finally, we switch gears to the **1993 PROCAR Northern Nationals**, recently held at the K/N Speedway. TQing the event was none other than Trinity's Joel Johnson. But when it was time to run the main event, it was Chris Smith who took home the win and the moola—a check for \$1,200! Not too shabby, huh? A ton of dinero (a little more than \$4,000 in prize money) was given out over the weekend, and a good time was had by all. Look for an in-depth race report in an upcoming issue.

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RACER NEWS

GPM GOODIES

Check out these two hot new products from GPM Racing Products. The first items are strong alloy differential halves for Associated's Stealth transmission.

According to the folks at GPM, they are half the weight and rotating mass of the stock units, and they're much stronger. The diff halves retail for \$14.95.

The second new items are chassis

stiffeners/free-floating damping systems, which are designed to dramatically improve the handling on your 12LW or 10L SS.

The brace stiffens the fore/aft chassis flex, which improves steering response, and the free-

floating damper allows equal pressure to be applied to the damper disks. This aids in stability and decreases the unpredictable feeling associated with a bumpy track. The stiffeners/damping system retails for \$39.95. If you're interested in GPM Racing Products, call (603) 883-4919.



Turn-in Time

Our hobby is faced with a recycling dilemma. The U.S. government has started to institute mandatory recycling programs of Ni-Cd batteries. This hits us hard because our hobby is one of the largest users of rechargeable batteries, and we are one of the few markets that actually dispose of thousands of these cells a year. In order to serve their customers and the industry better, Epic Energy Labs, the battery-assembly division of Trinity, will become a recycling center for all Ni-Cd batteries. Recycling Ni-Cds is very important, and it's an issue that will more than likely have increasing regulations put on it in the future. The people at Trinity want to make it as easy as possible for their customers to get started with Ni-Cd recycling. The new Trinity battery packs have the required recycling stickers and information enclosed. The following is Epic Energy Labs' nine-point recycling program:

- All Epic, Trinity, Speedworks and Point Blank customers may return rechargeable batteries to Epic Energy Labs for recycling.



- Boxes must be packaged so as not to allow short circuiting during transit.

- Batteries must be packaged in double-walled, corrugated boxes with the words "For recycling" marked clearly on the outside of the box. No additional words are permitted on the outside of the box.

- Batteries must be sent separately. Don't leave them installed in the vehicle, the remote, or the transmitter.

- Customers are limited to one shipment a month.

- To help offset disposal costs, there is a charge of \$.25 a cell. Customers must enclose a check made out to Epic Energy Labs. (A 6-cell battery pack counts as six cells.)

- Batteries can be returned from any manufacturer, e.g., Sanyo, Panasonic, Saft, GE, PTI and Associated. Epic's recycling program includes all rechargeable batteries, not just the ones produced by Trinity, Epic, Point Blank, or Speedworks.

- The customer must pay the postage to ship the batteries.



Go Italia!

1993 Italian National Off-Road Championships

Our Italian correspondent, Francesco Ristori, (in the middle wearing the Tekin hat) sent along this photo of the members of his local racing club—the TNT Racing Club, who took care of organizing the '93 Nats in Florence. The boy at the bottom of the picture is Francesco's youngest son, Guido. Watch him; he should be a real driving threat in the future!

Our Italian correspondent, Francesco Ristori, recently wired us with the results of his country's biggest electric off-road race of the year—the 1/10 Scale Italian National 2WD Off-Road Championship. In June, 39 drivers from all over Italy gathered in Florence to participate in the race. Unfortunately, Italy is in a recession right now, and attendance was down from last year's 70 entries.

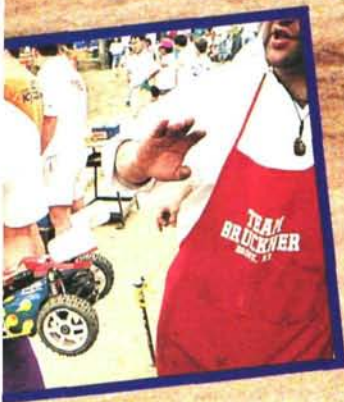
The track they raced on—"Il Boschetto" (the little wood)—is right smack in the center of town, and it uses part of a public park. It's tight and twisty with mixed terrain. Some parts consist of soft dirt; others are hard-packed.

Even though attendance was down, the racing was still intense. The race was run with three A-Mains, and Matteo Morelli was the dominant racer who won two of them. According to Francesco, Matteo could have won the other A-Main, but he was following his teammate and Francesco's son, Lorenzo Ristori, and he didn't want to risk a tangle between them. Lorenzo ended up finishing in first, second and third place, and he clinched second place overall. *Car Action* congratulates all our Italian counterparts, and we hope to see a few of you guys racing over here someday.

PLACE	DRIVER	CAR	BATTERIES	MOTOR
1	Matteo Morelli	Traxxas,	Trinity,	Trinity
2	Lorenzo Ristori	Traxxas,	Trinity,	Trinity
3	Andrea Pompilio	Schumacher,	N/A,	N/A
4	Andrea Efficace	Associated	Twister	Orion
5	Domenico Pietroleonardo	Team Losi,	Twister,	Orion
6	Franco Masini	Team Losi	Twister	Orion
7	Luca Francesch	Schumacher	N/A	N/A
8	Stefano Masinito	Associated	Trinity	Trinity
9	Fabrizio Giannozzi	Schumacher	Trinity	Trinity
10	Luca Ballini	Associated	Trinity	Trinity

First-place finisher, Matteo Morelli (left), and second-place finisher, Lorenzo Ristori (right) proudly display their championship trophies.





Action in the pits as Jay Halsey's crew tries to determine what went wrong with his Pirate car.

Georgia Giants!

KYOSHO

Radio Control
CAR ACTION

Southeast Gas Of

by FRANK MASI

HEADS UP, EUROPE AND ASIA; though we got off to a late start, we Americans are fast becoming world-class, 1/8-scale, off-road racers, and we're comin' for you at the '94 IFMAR Worlds! Electric guys such as Lett, Kinwald, Johnson, Ledger and Dunn have figured out the fun and are putting gas racing at the top of their agendas.

The Kyosho/Car Action Gas Tour recently stopped long enough in Atlanta, GA, to put on a slam-bangin' event (but of course!) called the Southeast Gas Challenge and, as anticipated, some of the world's best drivers rose to the occasion. As usual, the turnout was even better than anyone expected.



PHOTOS BY JOHN HOWELL

RACER NEWS



Mike Dunn's A-Main-winning Duratrax LX-T hustles around one of the tight infield turns.



f-Road Challenge

There were two classes in Atlanta; one for the sometimes frightening (and always overpowered) $1/8$ -scale, 4WD buggies, and one for the $1/10$ -scale 2WD trucks, whose popularity seems to increase with each event. In fact, trucks have become so popular that there has been talk of splitting the events next year so that the $1/10$ -scale gas trucks (and maybe buggies—see sidebar) can have their own race.

The format for this type of gas racing is still new, and it's always subject to change. For example, qualifying time was limited so that pit stops wouldn't be necessary. Everyone hoped that shorter qualifiers might allow for four full rounds instead of three, and the drivers were all for that!





Left: Kohji Sanada of Team Mugen Japan helps out Mugen USA driver Cliff Lett by performing an ancient head temperature/meditation ritual. Akira Kogawa, Lett's mechanic for the race, looks on in awe.

Team Racing Invades Gas

For better or for worse, "factory" racers have discovered gas cars, and all three

teams—Kyosho,

Mugen, and Pirate—invaded the peach state in search of the gold. The most impressive showing had to be from Team Mugen; these people are *serious*! Think I'm kidding? Here's a partial list of Mugen drivers: Cliff Lett, J.D. Beckwith, Brian Kinwald, Matt Ledger, Derek Furutani, Rick Hohwart and Hemet race top - qualifier, Doug Von Mosch. By comparison, the Kyosho team (Jack Johnson and Mike Dunn) and the Pirate team (Jay Halsey, Chris McElroy and Jay Katz) were tiny!

Kyosho's "Mini Inferno"

Kyosho's main R/C squirrel, Tom Grogg, always has something neat to show me whenever I go to the Gas Challenge races. Sometimes it's a real-

ly weird project car that Kyosho R&D has come up with after spending too much time at Alexander's Steak House in Champaign, IL. Other times, it's a new product that was just sent to the States from Kyosho Japan. Either way, I'm always entertained.

This year's surprise appeared to be—at first glance—a gas-powered Kyosho Lazer. A closer inspection revealed that I was looking at what Grogg referred to as the "Mini Inferno."

The aluminum chassis is stiffened by an aluminum upper plate that doubles as a radio tray. A three-diff drive system—similar to the



one used on Kyosho's Nitro Thrasher 4WD Monster truck—is connected to an O.S. CZ-R .12 engine by means of the center diff's spur gear and the engine's clutch-bell housing. A disk brake is attached to the center diff, and it's actuated by the throttle

servo. The suspension arms, shock towers and shocks look like Lazer pieces.

My curiosity was certainly piqued, but I wanted to see the thing on the track. Grogg promised that he would run the car before the Gas Challenge race was over, and he didn't disappoint me. Between the last qualifying round and the Mains, the Inferno Jr. was fired up and placed on the track—with Jammin' Jay Halsey at the controls! This must have been the durability test because Halsey is notoriously tough on equipment.

Jay let 'er rip, and the little screamer shot up the back straight so fast it looked like one of the 1/8-scale cars. Despite its immense power, the car appeared very stable, probably owing to its 4WD system. Halsey had so much fun that he refused to stop the car, even after one of the pins that held the front arms lost an E-clip and came off. After Kyosho officials wrestled him to the ground, I asked Jay about his impressions. He simply replied "Dude, you gotta get one!" I agree. Are you listening, Tom?

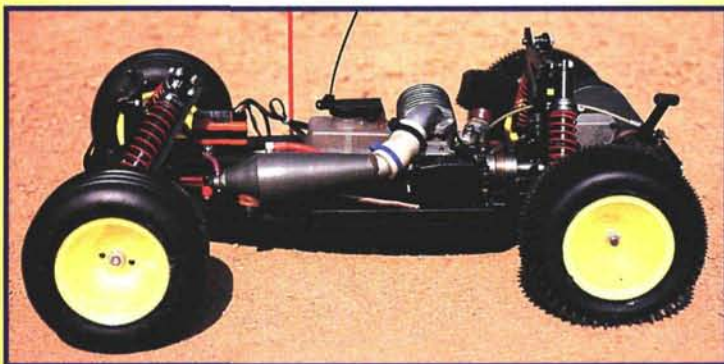
Electri-Gas? Experimental LX-T

More than 60 trucks competed at the Second Annual Southeast Gas Challenge, but two stood out from the field of A-Main, Duratrax and Traxxas trucks like sore thumbs. Team Losi driver Jack Johnson and driver Mike Weed raced experimental LX-T conversions that had some never-before-seen features.

First, Johnson explained that the trucks had been designed to duplicate the center of gravity and the front-to-rear balance points of the electric LX-T. The result is that the truck's handling is the same as its electric cousin. In fact, Johnson claims that he uses the same setup on the gas truck that he uses on his electric truck.

A cylindrical housing holds the pull-start mechanism, the brake and the clutch; it's bolted to the rear motor-mount plate as if it was an electric motor. The pull-start actually turns the engine 30 percent faster, because it works through the transmission's gear reduction. In addition, this arrangement eliminates the need for the installation of a one-way bearing in the engine. (This one-way bearing can fail and cause dirt and debris to contaminate and eventually harm the engine.)

The most interesting aspect of this conversion is that after you've removed just six screws (four that secure the engine pod and two that hold the "canister" to the motor mount) you're ready to mount a battery and an ESC, and go electric racing! Johnson claims that the conversion takes only five minutes.



QUALIFYING

Four rounds of qualifying heats were scheduled for the weekend: three on Saturday and a fourth on Sunday morning that was followed by the main events.

In the truck class, Jack Johnson emerged as the top dog, though the competition was much closer than it was last year. Driving the sister prototype of Johnson's truck, Mike Weed was hot on Jack's heels, and Mike Dunn's Duratrax[®] LX-T rounded out the top three. There were two experimental LX-T conversions, three Duratrax trucks, and five A-Main/Dudgeon Racing trucks.

The qualifying for the 1/8-scale buggy class seemed much more serious. All of the "fast" guys were grouped in the last two qualifying heats, so there were a lot of racers who were pumped when they posted a top-10 run early on, but they ended up back in the B- or C-Main when the dust from the last two heats had settled.

Right from the start, Team Mugen's Matt Ledger topped the field with a very fast, 21-lap run (almost everyone else was in the quick, 20-lap range). Kyosho's Kris Moore also clicked off a fast, 21-lapper as he chased Ledger's Super Sport around the track for the full seven minutes.

Ledger's time held, as did Moore's, placing them first and second on the A-Main starting grid. Cliff Lett, also driving a Mugen, got his act together late in the rounds to put himself in third. Jay Halsey and his Pirate were absolutely flying on the track, but Jay couldn't seem to catch a break. Jay told me that he was turning consistent 19-second laps during practice on an ungroomed track. He ended up in the fourth position on the grid.

WET AND WILD!

After two and a half days of beautiful, picture-perfect Georgia sunshine, the sky began to darken as the time for the A-Mains drew near.

First to run was the truck main. At the tone, Jack Johnson shot out in the lead with Mike Dunn's Duratrax LX-T in tow. These trucks

were so dialed-in that they made the buggies look "hack" in comparison. I later asked Johnson about this, and he told me, "The reason that the trucks appear to run smoother is that, number one, they aren't going as fast and two, all of the ruts and bumps on the track are from the larger buggies and are spaced further apart. The trucks are just running in between them." My mistake.

Early on, Johnson flamed out when he exited the pits (the mud had clogged his truck's exhaust), and this allowed Dunn to move into the lead. It looked as if Dunn would cruise to the win until the skies opened up and rain poured onto the track. Undaunted, the drivers kept going. Amazingly, they finished the race.

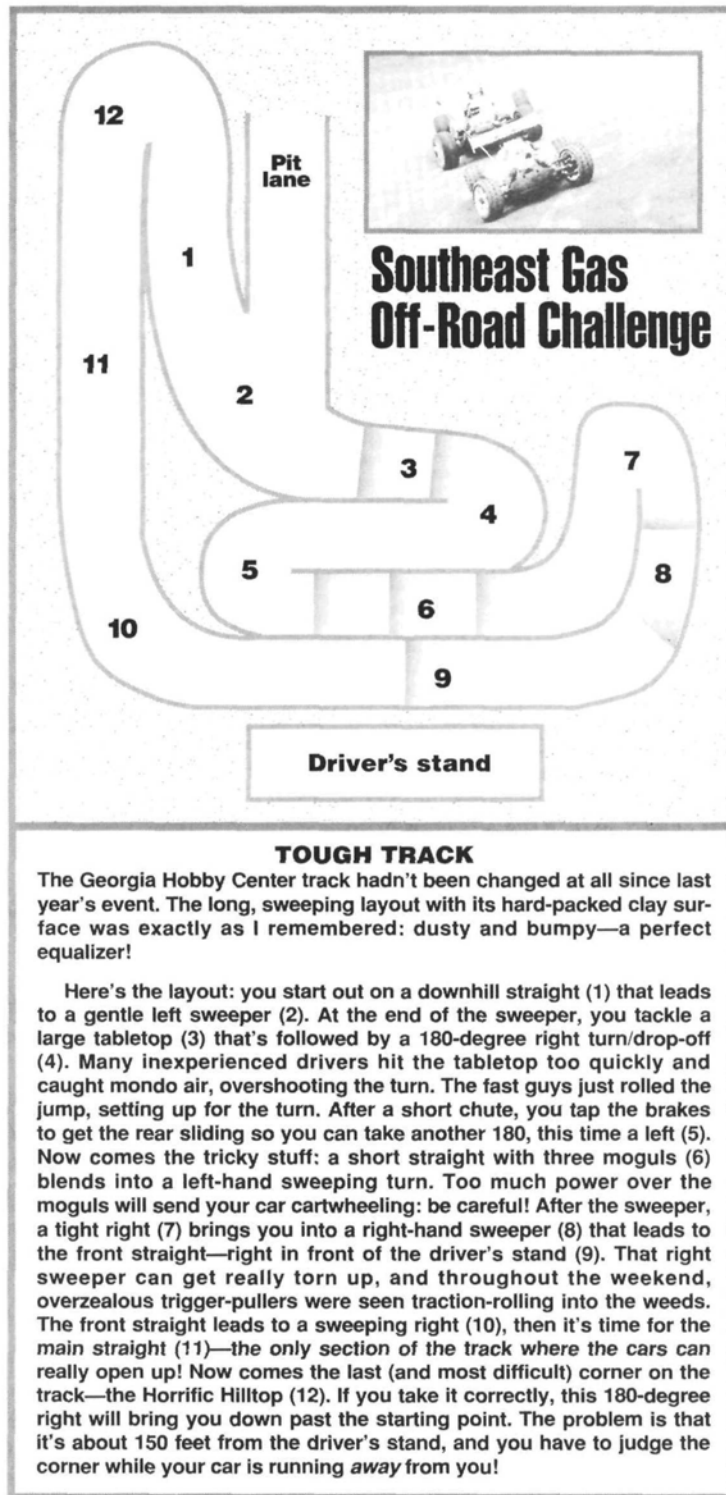
The track was covered with an inch of water. The truck's tires generated plumes that rose more than four feet into the air. Johnson was running again, but he was more than 10 laps behind Dunn with no chance at all. Ruffy Rios of Team Duratrax/Composite Craft sailed into second and managed to put some distance between himself and the Duratrax RC10T of Bobby Horan, who was running third.

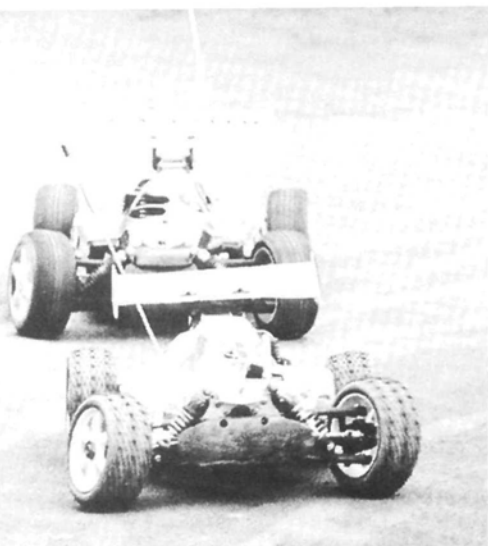
The rain continued to pound the track, but somehow seven of the trucks made it across the finish line. Dunn, Rios and Horan held their positions, while Carl Giordano made a late charge with his A-Main/Dudgeon RC10T to finish fourth.

The Buggy A-Main was scheduled to last a grueling 30 minutes. The rain had ceased, but the track was still submerged, and despite the efforts of the grooming crew, the race had to be run on a thoroughly

muddy track. To demonstrate just how slick the track surface had become, Team Bruckner's "Mad" Mike Pags did a gigantic belly flop and slid down the back straight. Are we having fun yet?

In the staging area, the cars were prepped for the mud. Most drivers sprayed their cars with WD-40 to prevent the mud from caking





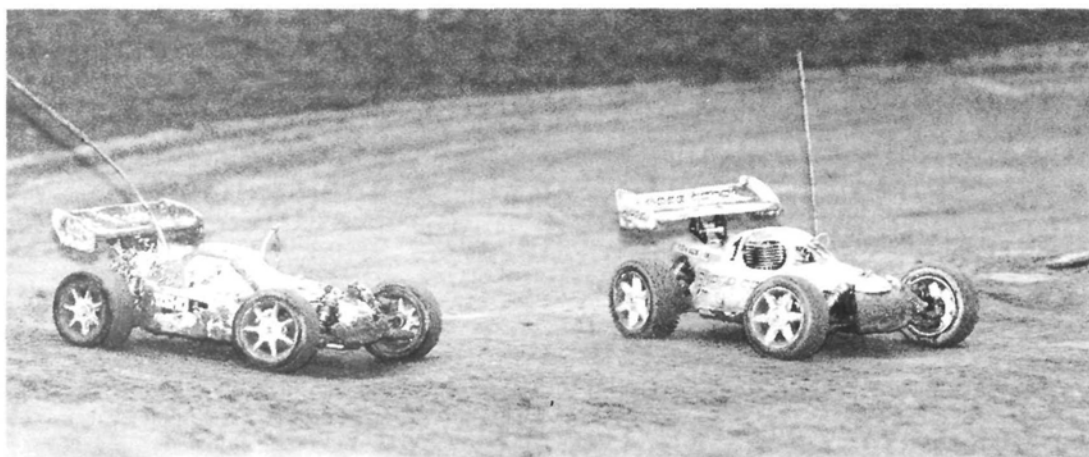
Dirty and clogged air filters are the number-one cause of engine failure in off-road gas vehicles. Air filters are the engine's only link to the "outside world," so

whatever passes through the filter will most assuredly pass through the engine. The best way to ensure long engine life is to keep those filters clean and oiled. In

and to prevent rust. Receivers were sealed with silicone to keep them dry, and racers and mechanics discussed setups and tires that would work on the mushy mud surface.

Finally, race announcer John Thawley called the A-Main drivers to the stand, and after a brief, 3-minute warm-up, the cars were placed on the line and the race was on.

Jammin' Jay Halsey shot out to the early lead, only to flame out before completing the first lap. From there, Kinwald and Moore diced and sliced for the entire 30 minutes. During the first portion of the main, Brian's Mugen was out in front with Moore's Inferno in pursuit. Kinwald stretched his lead out to about 30 feet until he came up to backmarkers, which allowed Moore to close.



Muddy Mains! Matt Ledger's top-qualifying Mugen Super Sport battles with the number-two car run by Kyosho's Kris Moore. Moore edged out Ledger to take the A-Main win.



Kyosho/Car Action Gas Off-Road

1/8-Scale Buggy

Fin	Qual	Name	Chassis	Engine	Pipe
1	2	Kris Moore	Kyosho Inferno	Paris Picco	Paris 650
2	5	Brian Kinwald	Mugen/Larry's	Rex	Mugen
3	4	Cliff Lett	Mugen	Paris Picco	Mugen
4	6	Larry Plank	Mugen/PRP	Picco	Mugen
5	4	Jay Halsey	OFNA/Pirate M3	Paris Picco	Paris
6	9	Mike Dunn	Kyosho Inferno	Paris Picco	Paris
7	8	Jack Johnson	Kyosho Inferno	Paris Picco	Paris 650
8	5	Chris McElroy	OFNA/Pirate M3	Paris Picco	Paris
9	10	Jay Kats	OFNA/Pirate M3	Paris Picco	Paris
10	1	Matt Ledger	Mugen Super Sport	Nova Rossi	Mugen EFRA 11

1/10-Scale Truck

Fin	Qual	Name	Chassis	Engine	Pipe
1	3	Mike Dunn	Duratrax LX-T	O.S. Max/Paris	Paris
2	4	Ruffy Rios	Duratrax RC10T	O.S. CZ-R	Duratrax kit
3	9	Bobby Horan	Duratrax RC10T	O.S. CZ-R	Duratrax kit
4	6	Carl Giordano	Dudgeon/A-Main	O'Donnell CZ-R	Paris
5	2	Mike Weed	Team Losi	RMS O.S.	Paris
6	5	Dave Campbell	A-Main	O.S. Max	McCoy
7	1	Jack Johnson	Losi LX-T	Paris O.S. CZ-R	Paris
8	7	Doug Von Mosch	A-Main	S.O.S.	McCoy
9	8	Rich Boomsma	A-Main RC10T	Prafa .12	McCoy
10	10	Melvin Nelsen	A-Main	O.S. CZ-R	Delta

Suck air, not dirt...

Atlanta, I met Steve Hiraoshita from Mugen Japan, and he gave me a hot tip on cleaning and oiling filters.

The Mugen team uses a homemade concoction that cleans and treats the foam outer

filters that they use on their Super Sport cars. Made of a 50-percent blend of isopropyl (rubbing) alcohol and castor oil, this mixture is poured onto the foam, then it's gently worked in and allowed

to sit. After about two hours, the foam element is slipped over the inner paper filter. According to Steve, this treatment is especially good at preventing small particles from entering your engine.

As a side benefit, a small amount of the castor oil is sucked into the engine as it runs. As you may or may not know, castor oil is the lubricant that's used in model-engine fuels.



At about the 20-minute mark, Moore made his move and passed Kinwald. Brian picked up the pace and challenged Moore, but he couldn't make the move. Moore couldn't get around a lapped car, and this allowed Kinwald to make up some time, but Moore held on to the lead in what had to be the closest finish in gas racing history—Moore with 84 laps in 30:19.11 and Kinwald with 84 laps in 30:23.45! Lett, who was running on the lead pace throughout the race, crossed in third and Larry Plank's Mugen was fourth.

CONCLUSION

Despite the rain, the heavy competition and the pressure, everyone seemed to enjoy the race immensely. This was the third gas race I've attended, and I always enjoy seeing the old faces and the new ones. Congratulations and thanks go out to Bill Jeric, John Thawley and the Georgia Hobby Center for making this a primo event. Get a nitro-burner and get out to one of these races. See ya there! ■

allenge

Fuel	Radio	Tires	Sponsors
O'Donnell	KO EX-1	Kyosho BSW 47	Kyosho, Paris Racing, KO Propo, Duratrax, Moore's Welding
Mu Juice	Airtronics	Pro-Line XTR	Mugen, Associated, Airtronics, Pro-Line, Yokomo, Reedy, Novak, HPI, RCPS, Lunsford, RCO, Larry's
Blue Thunder	Airtronics	Pro-Line	Mugen, Paris Picco, Airtronics, Pro-Line, Oakley, RCPS, Kogawa Design
Mu Juice	Airtronics	Pro-Line	Mugen, RCO, Reedy
Blue Thunder	Airtronics	Pirate X-pins	OFNA, Horizon, Paris, Airtronics
O'Donnell	KO Propo	Kyosho BSW 47	Kyosho, DuraTrax, Paris Racing, Race Prep, Team Losi, KO Propo, Novak, Jammin' Products, Skull Racing
O'Donnell	JR R-756	Kyosho BSW 47	Team Losi, Paris, Duratrax, Dirt Bagz, Oakley, Tecnacraft
Blue Thunder	Airtronics	Pirate X-pins	OFNA, Horizon, Paris, Airtronics
Blue Thunder	Airtronics	Pirate X-pins	OFNA, Horizon, Paris, Airtronics
Mu Juice	JR R-756	Mugen	Mugen USA, JR Remote Control, RCPS, Lunsford, Pro-Line, Associated, Reedy, Novak, Midwest Hobby Trax

Fuel	Radio	Tires	Sponsors
O'Donnell	KO Propo	Team Losi	Kyosho, Duratrax, Race Prep, Team Losi, KO Propo, Novak, Jammin' Products, Skull Racing
O'Donnell	Airtronics	Pro-Line/Losi	Composite Craft, Duratrax, Hobbico, RCPS, Associated
O'Donnell	Airtronics	Pro-Line/Losi	Composite Craft, Associated, Duratrax, Hobbico, HPI, Airtronics, RCPS
O'Donnell	Airtronics	Pro-Line/Losi	Bruckner Hobbies
O'Donnell	Airtronics	Team Losi	Team Losi, RMS Engines
Delta	KO Propo	Team Losi	A-Main, Delta Mfg.
O'Donnell	JR R-756	Team Losi	Team Losi, Kyosho, Duratrax, Dirt Bagz, Oakley, Tecnacraft
Delta	JR R-756	Team Losi	A-Main Racing, Delta Mfg.
Delta	JR R-756	Team Losi	A-Main Racing
Frickey	JR R-756	Losi/Pro-Line	A-Main Racing

RACER NEWS

Speed Shop

TRINITY

Lightweight EV10ss Parts

Did anyone ever tell you to lighten up? If they did, they probably weren't talking about your EV10ss, but Trinity thinks it's a good place to start. These lightweight hop-ups are just the thing for superspeedway racing, and you can save big bucks by buying them all as an upgrade package.

Part nos./prices—EV4045/\$82 (Light Superspeedway Chassis), EV4046/\$29 (Lite Bottom Pod Plate), EV4047/\$10.99 (Lite Nerf Wing), EV4048/\$26 (Lite Chassis brace with holes for sway bar), EV4049/\$137 (Lite Graphite Upgrade; the whole kit 'n' kaboodle for \$11 less!).

Trinity Products Inc., 1901 E. Linden Ave., #8, Linden, NJ 07036; (908) 862-1705.

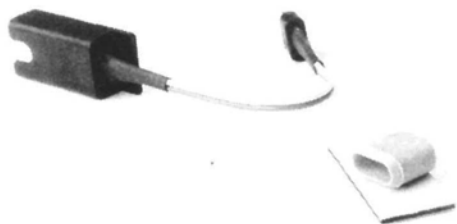
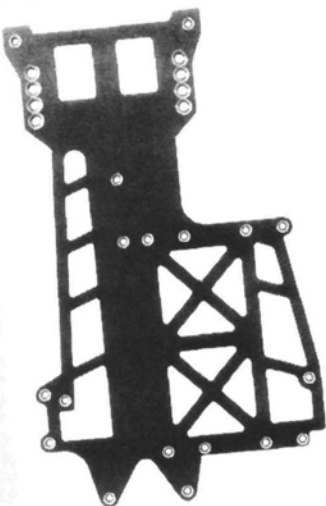
TRAXXAS

Pro-Trax Ribbed Front Truck Tires

Serious truck racers prefer ribbed front tires. Why? Because of their precise, predictable response. Made of a medium-hard rubber compound, these 2.2x2.0-inch Pro-Trax tires have 12 sharp ribs on a rounded carcass. Internal ribbing provides crucial sidewall strength, and the ribs supply maximum steering. They fit all 2.2-inch truck rims.

Part no.—4780; **price**—\$17.

Traxxas Corp., 12150 Shiloh Rd., #120, Dallas, TX 75228; (214) 613-3300.



RACER'S CHOICE

Crystal Extension Kit

Racer's Choice Crystal Extension Kit may be one of the best ideas to hit the R/C market in a long time! It can help to protect your receiver from dirt and water while allowing you to change your crystals quickly and easily. Using the kit, you'll be able to mount your crystal up to 4 inches away from your receiver, and independent lab tests indicate that the kit shouldn't give you range problems or cause interference.

Part no.—7044; **price**—\$5.95.

Racer's Choice, 6N258 Acacia Ln., P.O. Box 405, Medinah, IL 60157; (708) 980-4863.



BOLINK

Excel 1/12-Scale Tires

Bolink's latest 1/12-scale tires are must-try items! They not only look good, but they're of the same excellent quality as Bolink's 1/10-scale line. Try a set today!

Part nos./prices—BL-3022/\$9.95 (yellow-dot fronts), BL-3122/\$9.95 (yellow-dot rears), BL-3024/\$16.95 (black-dot fronts), BL-3124/\$22.95 (black-dot rears), BL-3025/\$9.95 (blue-dot fronts), BL-3125/\$9.95 (blue-dot rears), BL-3026/\$9.95 (green-dot fronts), BL-3126/\$9.95 (green-dot rears), BL-3028/\$16 (BSR radial gold-dot fronts—std.), BL-3128/\$16 (BSR radial gold-dot rears—std.), BL-3028L/\$16 (BSR radial gold-dot fronts—left), BL-3128L/\$16 (BSR radial gold-dot rears—left), BL-3029/\$16 (BSR radial silver-dot fronts—std.), BL-3129/\$16 (BSR radial silver-dot rears—std.), BL-3029L/\$16 (BSR radial silver-dot fronts—left), BL-3129L/\$16 (BSR radial silver-dot rears—left).

Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (404) 963-7334.

BUD'S RACING PRODUCTS

Threaded Front Stub Axles

Replace those E-clip axles with these 1/8-inch-diameter 4-40 locknut axles. They'll work in the new Associated I.S. front end.

Part no.—5520; **price**—\$3.50.

Bud's Racing Products, 1575 Lowell St., Elyria, OH 44035; (216) 284-0270.



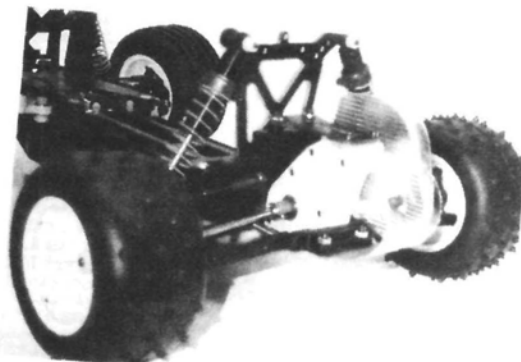
A&L

Lethal Weapon 2

This top-of-the-line, state-of-the-art tranny was designed for all-out racing. Its more efficient belt drive means longer run times, quieter operation, durability, and smoother, faster acceleration. It's available for the Losi LX-T, the Traxxas Blue Eagle LS and Associated's RC10T.

Part nos.—PT192 (Losi, with dogbones and power clutch), PT195 (Traxxas, with dogbones and power clutch), PT196 (Associated, with power clutch); **prices**—\$117, \$112, \$102.

A&L Mfg., P.O. Box 2115, Corona, CA 91718; (714) 735-5249.



MIP

Super Diff Rebuild Kit

Racers have been waiting for super-hard, polished diff rings for the stock Losi diff. Well, the waiting is over! MIP's Super Diff Rebuild Kit for Losi's stock diff comes with polished diff rings, super carbide balls and MIP's low-grit lube. You'll get twice as many runs between rebuilds!

Part no.—L-150; **price**—\$10.95.

MIP, 746 E. Edna Pl., Covina, CA 91723; (818) 339-9007.



TEAM CLASS

Dual Motor Stand

With Team Class's motor stand, dyno work and motor break-in are easy. Connect your race motor to a slave motor using the coupler that comes with the stand; use a digital voltmeter to use the stand as a dyno: run the race motor and read the voltage generated by the slave unit. You can also use the slave motor to break in your new powerplant without applying power. Just run the slave motor backward while it's connected to your new race motor.

Part no.—6003; **price**—\$12.95.

Class Recreational Products Inc., RD 1 Box 187A, Utica, NY 13502; (315) 724-8052.

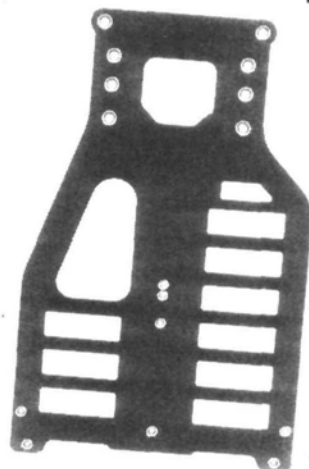
COMPOSITE CRAFT

10LSS PS-94 HBRT Chassis

This Pro-Series chassis is made of Composite Craft's revolutionary graphite composite; it's thicker, stronger—and lighter! There are three battery slots on the right of this chassis, so it's perfect for high-banked ovals and rough tracks where a 3/3 or 4/2 battery placement is what you need.

Part no.—10134; **price**—\$59.95.

Advanced Diversified Composites, 7640 Commerce Center Dr., Orlando, FL 32819; (407) 351-6081.



Descriptions of the products shown on these pages were derived from press releases supplied by manufacturers and/or their advertising agencies. The information given is neither an endorsement of the product by *Radio Control Car Action*, nor a guarantee of performance or safety. If you write to the manufacturer about any product described here, be sure to say that you read about it in *Radio Control Car Action*.

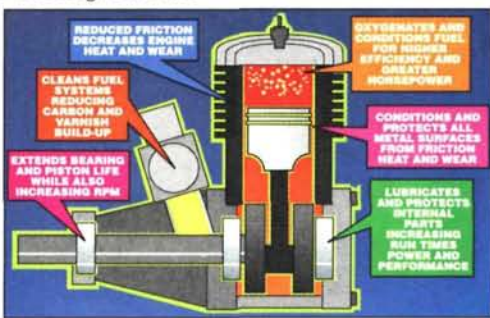
SSSSSS SECRET WEAPON!!!!!!

POWER REV

Due to the revolutionary affect new Snake Oil Lubricants' Power Rev is having on R/C engines,

many modelers are making it their "Secret Weapon". Power Rev will quickly transform any R/C engine into a faster, smoother, more powerful and efficient powerplant.

The special SP-10 lubricant formula in Power Rev R/C Fuel Treatment, R/C Engine Treatment, and R/C 2-Cycle Oil is the secret that effects a positive change in the surface metal of all internal engine parts. This electro-chemical conditioning causes the parts to become



TURNING ENGINE RED LINES GREEN

repellent to each other which helps to eliminate friction. The results are phenomenal! Power Rev R/C Fuel Treatment stabilizes and oxygenates fuel for more efficient combustion, and even longer running times.

And regular treatment with Power Rev R/C Engine Treatment will guard your engine from wear as it lubricates and protects all internal engine parts. The big names in R/C are using Snake Oil lubricants now and they swear by them. So if you notice a bottle of Power Rev hidden in a buddies field box you'll know why he hasn't told you about it... that's his secret weapon!



"After the increased speeds my Aggressor achieved, I use Snake Oil Lubricants to treat all my R/C equipment."
--David Ribbe



LUBRICANTS

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"After 10 years of experience with ducted fan engines, nothing compares to the performance gained from using Power Rev Additives."
--Dennis Crooks

• Power Rev R/C Engine Treatment - SO-01 • Power Rev R/C Fuel Treatment - SO-02 • Power Rev R/C 2-Cycle Oil - SO-06 •

TRINITY EV10SS

(Continued from page 33)

good results, so I used them again. I usually start off with Green rears, a Blue left front and a Blue/Orange right front.

Because all of my radios are currently seeing action, I borrowed Doogie's KO-Propo* EX-10 mega-everything radio and combined it with a Novak* NER-3FM receiver and 410-HPc "Hyperfet" ESC. Trinity supplied a potent set of its Pushed Panasonic P-170 batteries and its new PRO-CAR Stock Motor. I'm psyched about this 21-turn powerplant, because I think that it ushers in a new era in stock motors. Batteries and speed controllers have become better over the years, so why not stock motors? I topped the whole shebang off with a Bolink* Narrow Pontiac body that I'd had painted by Scot Bich at Bich'n Bodies*. The rad "patriotic" scheme looks pretty wild, eh? I had to add about 1/4 inch of spacers under the rear body-mount posts to raise the Bolink body off the ground.

Arriving at the track (a banked carpet oval), I put two packs on charge and made a final check of the car's components to make sure that nothing was loose or improperly installed. After a couple of slow laps to confirm that my steering trim was centered, I squeezed the trigger harder and put the EV10ss through its paces. Bam! Major push coming out of turn two. How to solve this? I didn't want to rely on stickier front tires: that's a cop-out. I tightened the spring collars on the two side shocks to decrease chassis roll and stiffen the rear end. It was much better, but I needed more steering out of the turns. On went the Jaco Blue compound rear tires. That was the ticket! I could loosen the rear suspension again, and this also made the car less twitchy down the straights.

I set the front end according to the instructions, and added about 2 degrees of positive camber to the left wheel and about 1 1/2-degrees of negative camber to the right. The toe-in/out was zero (the wheels pointed straight ahead). Caster (inclination of the kingpin) angle was set at approximately 2 degrees, moving to zero degrees when the suspension was in full compression.

Do I like the way the car handles? Very much. The rear pod moves so freely that I had to switch to rear tires with less bite to gain steering. Now it's a rocket out of the turns, with just the right amount of push to make it easy to drive. I've used the car enough to begin playing with the front end. I've been slowly setting the front-wheel camber so that the tires wear evenly; and someday I'm gonna try shortening the right-side front link, like the left, to gain a bit more steering. That's the cool thing about this car; there's always something to experi-

(Continued on page 100)

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TRINITY EV10SS

(Continued from page 88)

ment with at the track.

To sum up the EV10ss: tons of adjustments, and parts of excellent quality with performance to match. Minor flaws, such as steering turnbuckles from the wide car (which I had to cut), other miscellaneous hardware goofs, and a somewhat confusing instruction supplement aren't enough to sway my opinion to the negative side. This is the hottest new oval racecar in town. Other companies are tooling sophisticated new designs to compete with the next generation of superspeedway cars. I'll be at the track to see which wins; will you?

*Here are the addresses of the companies mentioned in this article:

Trinity Products Inc., 1901 E. Linden Ave., #8, Linden, NJ 07036; (908) 862-1705.

Jaco; distributed by Pro-Line USA, P.O. Box 456, Beaumont, CA 92223; (714) 849-9781.

KO Propo; distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728; (714) 964-0827.

Novak Electronics Inc., 18910 Teller Ave., Irvine, CA 92715; (714) 549-0857.

Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

Bich'n Bodies, 4903 Cloverfield Dr., Pearland, TX 77584; (713) 485-0413. ■

SUPER SPORT TOYOTA

(Continued from page 48)

essary to remind potential buyers that, because of its size and speed, this and all

other competitive gas-powered cars and trucks can be potentially dangerous if misused. This truck is *not* a toy. It's a sophisticated, high-performance, racing, scale replica. *Car Action* also takes no responsibility for those buyers who require lengthy therapy for "fun" overdoses.

Finally, although it has been said before, it's important to note that *Car Action* gives its writers total freedom to express their feelings about a product. No one dictates what kind of review to give a particular car. If I like it, I say so. If I don't, I say so. It's that simple, and it's that kind of freedom that ensures that you, the reader, will get the right kind of information. I like the Mugen truck, and you will too. It's big; it's bad; it's noisy and it's in your face! 'Nuff said!

*Here are the addresses of the companies mentioned in this article:

Mugen USA, 7021 Veterans' Ave., Brooklyn, NY 11234.

Bich'n Bodies, 4903 Cloverfield Rd., Pearland, TX 77584.

O.S.; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826.

Airtronics Inc., 11 Atry, Irvine, CA 92718.

O'Donnell, 10702 Hathaway Dr., Unit 2, Santa Fe Spring, CA 90670.

Nova Rossi; distributed by Racer's Choice, 6N258 Acacia Ln., Medinah, IL 60157.

McCoy Racing, 1778 Albright Ave., Upland, CA 91786. ■

SCHUMACHER 2000

(Continued from page 72)

Occasionally, some flashing is left on a part, so a sharp X-Acto knife is needed.

When you build the shocks, make sure that the (T1222) bushing properly snaps into the seal housing, or you'll be tearing apart your shocks to fix the problem. This process occurs in step 2 of the shock absorber assembly section. There are no plastic drive-shaft ends or U-joints to put together, and you won't have to worry about proper belt tension.

RAGING HORSEPOWER

Once the 2000 was assembled, I asked Robert O'Mea of Precision Motor Works* to set me up with one of their new Rage series modified motors. I installed a 13-turn, double-wind Rage Class motor. To finish the job, Derek Povah of Stealth Electronics* sent me some of their new, Sanyo 6-cell 1700 SCRC Stealthpacks.

Need I say anything about the quality and success of Tekin* Electronics? I installed a new computer-controlled 410K speed controller and a Tekin TFM micro receiver. The 410K has all the bells and whistles needed to satisfy any serious driver.

(Continued on page 158)

New

2041 TRX-1
Pro Clutch
42.95

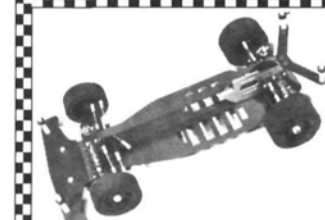
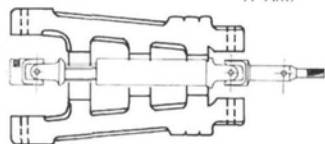
RC-10 and RC-10T

2003 RC-10 Telescoping Drive System
w/H-Arm for Stealth 49.95

2005 RC-10T Telescoping Drive System
w/H-Arm for Stealth 49.95

2005

Heavy-duty
H-Arm



Invencer

3 versions available:
X-10 Car, XT Truck, EM-10

CUSTOM WORKS & TITAN

2080 C/W & Titan Hard Anodized Shock Bodies (4) 24.95

2081 C/W & Titan Aluminum Spring Retainer (1) 6.00

2084 C/W & Titan Aluminum Double O Rings (1) 5.95

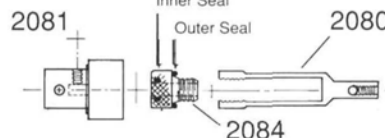
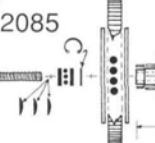
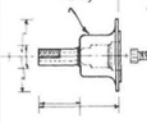
2083 C/W Intimidator
Telescoping Drive
System 54.95

2085 C/W Intimidator
Lite Weight ProBall
Diff. 44.95

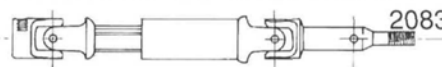
RC-10, JRX Pro
Oval Chassis Available

Titanium Aluminum
Alloy

2085



Telescoping Drives w/H-Arms Available For:
• RC-10 to (MIP & J-CAR) 2001;
• RC-10 to (Trackmaster) 2003;
• RC-10 to (old conversion truck) 2004.

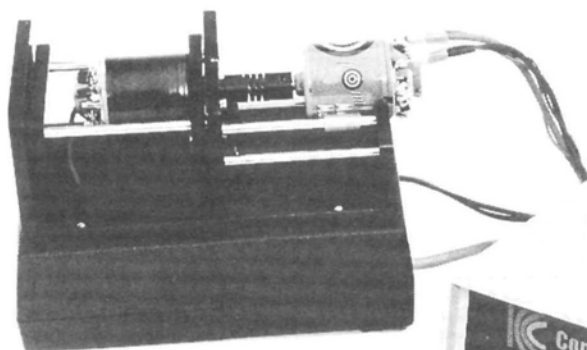


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Bellaire, TX 77401
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Special Thanks for Rod Ward,
Mike Bell and Team Riverside
for support and R&D.

ALL PARTS Available Separate

SPIN YOUR MOTORS DO-SI-DO



The TURBOdyno has a main module (right) and a separate motor testing pod (left). An optional Hewlett-Packard thermal printer is shown on top of the main module.



PHOTOS BY WALTER SIDA

BUILDERS OF full-size racing cars use dynamometers to evaluate their engine's performance; so if you're a serious radio-control car racer, why shouldn't you use one to test your electric motors?

A high-quality electric motor dyno can provide you with a great deal of vital information. It can tell you if your motor is worn or performing inefficiently, and it can measure the effects of brush and spring changes. It also helps you to rate your motors according to their performance levels. Many racers use the number of turns or the type of wind as the sole means of gauging a motor's application. A much better method is to know your motor's torque and efficiency properties through the use of a dyno. This, along with rpm ratings at given amp loads, will enable you to calculate the *right* gear ratio for any particular motor on any track condition.

WHICH DYNO IS FOR YOU?

If a dyno is within your racing budget, before you buy one, you should carefully consider how you'll use it. There are many types from which to choose; some are expensive, some are not. If you're a "club" racer who wants to know when it's time to replace brushes

or rebuild a motor, then there are several low-end dynos that will suit you. At the highest level of competition, proper motor selection and tuning can make the difference between winning and losing, so pro racers and motor builders require more precise data and more information than average racers. The Competition Electronics* TURBOdyno offers this kind of precision. It's the most expensive one (retailing just under \$1,000), but it does everything you'd expect a high-end dyno to do, and it has several unique features.

TURBO FEATURES

The TURBOdyno comes in a foam-lined box that doubles as a carrying case. The dyno itself comprises two modules: the main control unit, which shares its housing with the company's TurboThirty charger, and the motor pod, which holds the slave

motor and the test motor. The motor pod contains the torque sensor, which, unlike that of other dynos, actually measures the motor's direct torque output. An infrared interface on top of the

by
FRANK
MASI



Information is relayed from the TURBOdyno to the optional printer by an infrared sending unit on top of the dyno's main module.

COMPETITION ELECTRONICS TURBOdyno

TEST IN TORQUE AMP, VOLT STEPS

1 First, determine whether you want the test value to be torque, volts, or amps. If you choose amps or torque, then the voltage will remain constant. If you pick volts, then the motor amps will be held constant.

CONSTANT MOTOR AMPS

2 With this screen, you can set the values for the constant motor amps or volts (depending on which test value you choose from the previous screen).

Custom programming

You can alter the test parameters of any of the four preprogrammed test steps, or you can create your own.

STEP1 VOLTS .00

3 This screen lets you set the value of the motor amps, torque, or volts. In this case, the variable is volts, so you would plug in the amount of voltage to be applied to the test motor for each of the steps (up to six).

Once you've selected the desired values, you can store them by going to the STORE SETUP screen. You can create as many as eight setups. You may also clear the TURBODyno's current memory by choosing the CLEAR SETUP VALUES screen. This doesn't affect the unit's power down memory, which allows you to recall the dyno's four original setup steps.

GRAY MATTERS

Now that I've described the TURBODyno's body, it's time to talk about its brain. The TD is completely controlled by a microprocessor, and it can provide four direct readings from the test motor: torque, rpm, operating voltage and amp draw. In addition, the unit can calculate the test motor's efficiency and its output in watts.

Many motor experts think that the ideal way to test a motor's performance is to simulate the actual conditions in which it will be used. The TURBODyno can be programmed to simulate

main unit's case is for the optional (but highly recommended) Hewlett-Packard thermal printer. You'll want the printer because, when you're working with numbers, nothing beats a hard copy!

Competition Electronics provides a 5-foot-long supply lead to hook the dyno up to your favorite power supply (see sidebar). The leads that are used to connect the motor to be tested to the main dyno module must be soldered on. Alligator clips would be easier, but CE thinks that the leads should be soldered to achieve the truest readings. Small leads, which control the voltage applied to the motor, are wrapped around the larger, main leads and soldered to the

test motor. Using this method, you'll know that the voltage reading you get from the dyno is the exact voltage applied to the motor.

The slave motor is attached to a pivoting mount that contacts the torque sensor. When the test motor is run, it spins the slave motor (the two are connected through a flexible coupling) which, in turn, twists its mount into the torque sensor. The harder the mount contacts the sensor, the higher the test motor's torque will be. Most dynos calculate data to give torque readings; this dyno actually measures torque. I like real-world figures!

eight running conditions; four have been programmed into the unit, and you can custom-program the other four. Each setup can have as many as six steps, in which the applied amount of volts, amps, or torque can be varied to simulate use in an R/C car. Each step lasts approximately 4 seconds. The TURBODyno also allows you to manually operate the step increments. The automatic setting ensures more consistent motor information because it operates in exactly the same way every time.

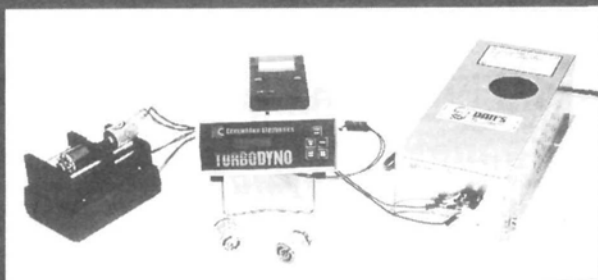
TURBOPERATION

Once you've installed the test motor in the motor pod, you must determine which of the four preprogrammed steps you should use to test your motor. Or, if you wish, you can use your own program. Setups 1, 2 and 3 test the motor by loading it with six preprogrammed torque levels. These loads simulate those placed on your motor during acceleration and turning.

Power trip

The TURBODyno will operate from any power supply that can produce 12 to 13.8 volts of DC current, provided the supply can sustain loads of 30 amps or more. The dyno can be used with less power, but testing will be limited to the capacity of the supply.

Automotive batteries can be used, but they're not recommended because their voltage level will drop considerably when they're loaded to 30 amps. They also emit harmful gases when in use. If you must use an automotive battery to power your dyno, keep it far away from the dyno

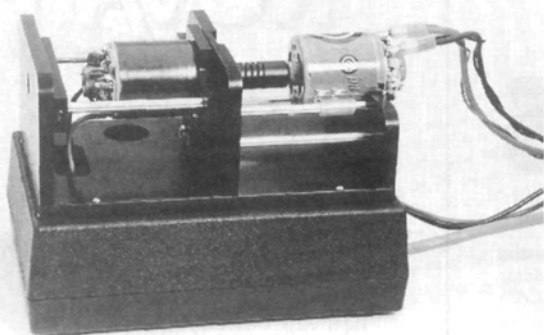


and its operating motors, and use it only in a well-ventilated area. Competition Electronics recommends that you use a power supply that's capable of producing 12 to 13.8 volts and has 30 amps of capacity. I chose to use a Dan's RC Stuff power supply.

and its operating motors, and use it only in a well-ventilated area.

RECALL SETUP

• Recall Setup 1 is for 11- to 15-turn modified motors. A



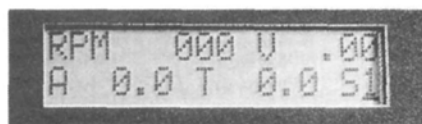
The motor pod holds the test motor and the slave motor. The slave motor is attached to a mechanical torque sensor, which measures physical torque. Most other dynos calculate torque using other data.

constant 5 volts is applied to the motor along with the following torque loads: 1.4, 2.9, 4.0, 5.0, 6.0 and 7.0 ounce-inch.

- **Recall Setup 2** is recommended for stock motors. A constant 5 volts is applied with the following torque loads: 1.4, 2.9, 5.0, 7.0, 9.0 and 11.0 ounce-inch.

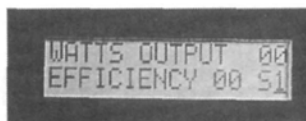
- **Recall Setup 3** is for 15- to 24-turn modified motors. A constant 5 volts is applied with the following torque loads: 1.4, 3.5, 5.0, 6.5, 8.0 and 9.6 ounce-inch.

- **Recall Setup 4** loads the motor with pre-programmed amp draw levels of 7.5 to 30 amps. It's also important to note that the TURBOdyne starts the motor running slowly at first to avoid overloading the power supply. Also, the load settings won't exceed the unit's maximum current draw of 35 amps (note: at an additional cost, Competition Electronics offers a 45A option for the TURBOdyne).



Once you've selected your setup, it's time to go to the Motor Run Screen. This is the screen to watch while the motor is running and the dyno is going through its test steps. Place your finger on the test motor to keep it from rotating on the motor pod, and press the START/STOP button to start the test. As the dyno goes through its steps, you'll be able to see how your motor is performing. Pay particular attention to its rpm because an unstable reading is the best indication that your motor's comm or brushes are worn.

Once the test has been finished, you can either print the data (if you have the optional printer, of course), or you can scroll through each of the six steps by pressing the INCR SET button.



By using the INCR SET button, you can also use the Auxiliary Data screen to check your motor's output and efficiency through each of the six test steps. If you want to determine your motor's horsepower rating, simply divide its output watts by 745. If you're using the manual test mode, you can display this screen even while the motor is running.

PRACTICAL APPLICATIONS

So far, I've talked about the numbers that the TURBOdyne can generate, but you're probably wondering what all this means in the real world. When you test modified motors, you'll want to use the motor that has the best efficiency for its particular wind. You can enhance the motor's efficiency by playing with its timing and its brushes and springs. For stock motors, you want the motor with the highest output in watts. Again, play with the motor's brushes and springs to get the power you want. An rpm drop will usually increase the motor's power output. By changing its gearing, you can make use of its increased "punch."

TURBORIFFIC

Despite its overall complexity and its numerous features, I found the TURBOdyne to be very user-friendly. I liked the consistency of its readings, and the amount of information it gives is mind-boggling, to say the least. How do you rate something like this? It's like trying to compare a limited-production Aston Martin to a mass-produced Saturn; it's apples and oranges because there just aren't any other dynos that offer the same features (or that cost as much) as the TURBOdyne. Still, this is the best dyno on the market, if you're willing to spend the money.

**Here are the addresses of the companies mentioned in this article:*

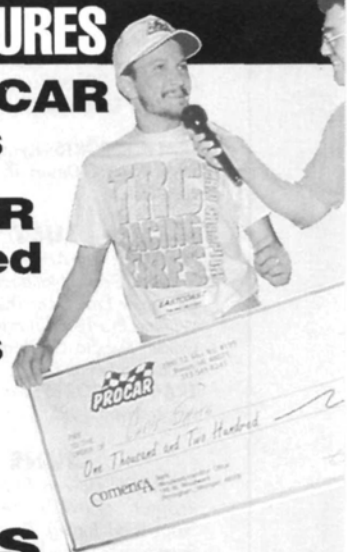
Competition Electronics Inc., 3469 Precision Dr., Rockford, IL 61109; (815) 874-8001.

Dan's RC Stuff, 9525C Cozycroft Ave., Chatsworth, CA 91311.

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ALABAMA

Berry R/C Raceway, Main St., Berry, AL 35543; Ronny, Don, (205) 932-3189



CJ's Hobbies, 3761 Government Blvd., Mobile, AL 36693; C.J., (205) 666-0016



Dixie R/C Speedway, Rt. 10, Box 210, Gadsden, AL 35901; Craig Reynolds, (205) 442-1059



Fleming's R/C Raceway, 169 Raceway Dr., Wellington, AL 36279; Phil Fleming, (205) 820-6269



Oak Mountain Raceway & R/C Club, 2624 Janice Circle, Birmingham, AL 35235; Will Barrett, (205) 856-7051



Performance R/C Hobby, 2600 A Beltline Rd., Decatur, AL 35603; Ray & Debra Steen, (205) 353-3399



Phenix Raceway, 2006 Opelika Rd., Phenix City, AL 36867; Casey Hoover, (205) 297-0040



Piedmont R/C Superspeedway, 41 Jewel Lane, Oxford, AL 36203; Terry Young or Greg Gaines, (205) 831-2986 or 831-1666



R/C Hi-Tech Raceway, 3303 Meridian St., Huntsville, AL 35811; Rick Chambers, (205) 539-1347



Satellite Hobbies, 2799 Rose Rd., Albertville, AL 35950; Troy or Jerry Smith, (205) 878-2526



Spring Cove Speedway, Rt. 1, Box 95, Florence, AL 35630; Chuck or Lyda Sybolt, (205) 757-5998



ALASKA

ARCORR, 2812 Spenard Rd., Anchorage, AK 99503; Jim Raffuse, (907) 277-7778



McKinley Hobby & Raceway, 2300 McKinley Dr., Wasilla, AK 99654; (907) 376-9351



Seth's Speedways, 3400 Hiland Dr., Anchorage, AK 99504; Seth Graham, (907) 337-3777



Southtown Hobby & Raceway, 12001 Industry Way #2, Anchorage, AK 99515; Bob or Vickie Peters, (907) 345-3131



ARIZONA

Economy One-Stop Raceway, 4000 S. 4 Ave., Yuma, AZ 85366; (602) 344-3514



Finish Line Raceway, 7025 E. 21st St., Tucson, AZ 85710; Jerry Kikkert, (602) 747-3633



G&S Raceway, 967 Hancock, Bullhead City, AZ 86442; Bob Olsen, (602) 758-1100



Havasu R/C Raceway, 1081 Desert View Dr., Lake Havasu City, AZ 86403; Bernie Coates, (602) 680-6304



HobbyTown Raceway, 9180 E. Indian Bend Rd., Scottsdale, AZ 85250; Dennis, (602) 948-3946



HobbyTown Raceway, 1915 East Baseline Rd., Gilbert, AZ 95234; Kenny, (602) 892-0405



Outlaw Raceway, 5309 Lakewood Rd., Ft. Mohave, AZ 86427; Frank Greely, (602) 768-5001



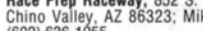
R/C Raceplex, 5222 W. Glendale Ave., Glendale, AZ 85301; Bill Murray, (602) 934-5567



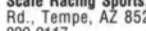
R/C Sports Mania, 3550 N. 35th Ave., Phoenix, AZ 85017; Brian Dick, (602) 278-3671



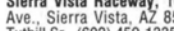
Race Prep Raceway, 852 S. Hwy. 89, Chino Valley, AZ 86323; Mike Dunn, (602) 636-1955



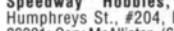
Scale Racing Sports, 1120 N. Hayden Rd., Tempe, AZ 85281; Mike, (602) 829-9117



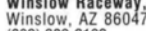
Sierra Vista Raceway, 105 N. Central Ave., Sierra Vista, AZ 85635; Wayne Tuthill Sr., (602) 459-1335



Speedway Hobbies, 1000 N. Humphreys St., #204, Flagstaff, AZ 86001; Gary McAllister, (602) 556-0710



Winslow Raceway, 813 E. 3rd St., Winslow, AZ 86047; Shawn Wilkie, (602) 289-2192



ARKANSAS

Arkansas Int'l. Superspeedway, P.O. Box 1636, Pine Bluff, AR 71613; Joe Pitts, (501) 247-2371



DCA Racing, 412 Hiway & 14th St., Paragould, AR 72450; Lyle Spillman, (501) 236-9706



Performance Hobbies, 2222 Spence, Jonesboro, AR 72401; (Rick) Winningham, (501) 935-6501



CALIFORNIA

Appletree Raceway, 1303 Hermosa Ave., Pacifica, CA 94044; Sonny Day, (415) 359-9755



ARO Hobbies Raceway, 24275 Sunnymead, Moreno Valley, CA 92553; George or Mike Klien, (714) 924-3240



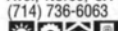
Art & Dean Raceway, 29409 Haquest, Lake Elsinore, CA 92530; Art, (714) 245-0920



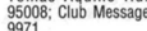
Bob & Jim's R/C World, 3485 University Ave., Riverside, CA 92501; Bob Parcell, (714) 684-6314



Brake-a-Way Raceway, 3179 Hamner Ave., Norco, CA 91760; Debbie Burrie, (714) 736-6063



California Auto Racers (CAR), 96 San Tomas Aquino Rd., Campbell, CA 95008; Club Message Line, (415) 508-9971



Cats West Raceway, 5631 Old Lonetree Way, Antioch, CA 94509; Jerry Winkelbaver, (510) 779-0505



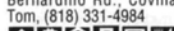
City Speedway, 7750 Convo Ct., San Diego, CA 92111; (619) 560-9633



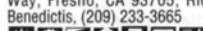
Cloverdale R/C Raceway, 1 Citrus Fair Dr., Cloverdale, CA 95425; Tom Kelley, (707) 586-9789



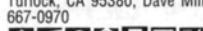
Covina Racing Company, 1611 W. San Bernardino Rd., Covina, CA 91722; Tom, (818) 331-4984



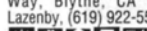
Cycle Art Raceway, 2211 N. Pleasant Way, Fresno, CA 93705; Richard De Benedictis, (209) 233-3665



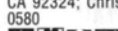
D&D Raceway, 290 S. First St., Turlock, CA 95380; Dave Miller, (209) 667-0970



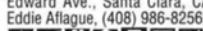
Desert R/C Raceway, 9231 E. Hobson Way, Blythe, CA 92225; Rodney Lazenby, (619) 922-5516



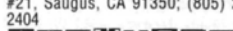
Drag City, 1361 W. Valley Blvd., Colton, CA 92324; Chris Gabriel, (714) 370-0580



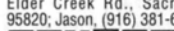
Fast Eddie's R/C Raceway, 3261 Edward Ave., Santa Clara, CA 95054; Eddie Aflague, (408) 986-8256



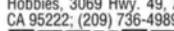
Fast Lane, 25845 San Fernando Rd., #21, Saugus, CA 91350; (805) 255-2404



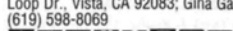
The Finest R/C Off-Road Circuit, 8711 Elder Creek Rd., Sacramento, CA 95820; Jason, (916) 381-6555



Frogtown R/C Raceway, Motherlode Hobbies, 3069 Hwy. 49, Angels Camp, CA 95222; (209) 736-4989



Gina's R/C Palace, 1839 Olympus Loop Dr., Vista, CA 92083; Gina Garner, (619) 598-8069



G.L.A.R.C.R.C., Whittier Narrows Park., Rosemead, CA 91770; Jon D'Angiolillo, (310) 944-0870



Greater Los Angeles R/C Racing Club, California State University, Parking Lot A, Los Angeles, CA 90045; Glenn Williams, (213) 734-7888 or Tom Wong, (310) 821-5472



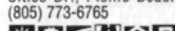
Hayes Raceway, 628 Walnut Ave., Patterson, CA 95363; Andy Hayes, (204) 892-5080



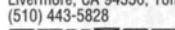
Hobbycrafters, 1319 Pacific Blvd., Oceano, CA 93445; Craig or Damian, (805) 481-3883



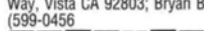
Hobbycrafters Raceway, 323 Five Cities Dr., Pismo Beach, CA 93449; (805) 773-6765



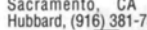
Hobby Haven Raceway, 3983 First St., Livermore, CA 94550; Tom Welding Jr., (510) 443-5828



Hobbytown Raceway, 1330 Keystone Way, Vista CA 92083; Bryan Bahlmann, (599-0456)



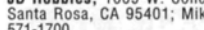
Hobby Warehouse, 5500 So. Watt, Sacramento, CA 95828; Roger Hubbard, (916) 381-7587



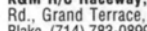
Jackman's R/C Raceway, 1616 N. Beale Rd., Marysville, CA 95901; Bonnie or Harry Jackman, (916) 741-3744



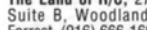
JD Hobbies, 1009 W. College Ave., Santa Rosa, CA 95401; Mike, (707) 571-1700



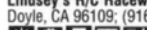
K&M R/C Raceway, 22474 A Barton Rd., Grand Terrace, CA 92324; Mike Blake, (714) 783-0899



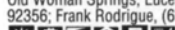
The Land of R/C, 2717 Gerber Road, Suite B, Woodland, CA 95695; Le Forrest, (916) 666-1699



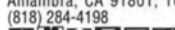
Lindsey's R/C Raceway, P.O. Box 443, Doyle, CA 96109; (916) 827-2457



Lucerne Valley Raceway, 32800 #4 Old Woman Springs, Lucerne Valley, CA 92356; Frank Rodriguez, (619) 248-7305



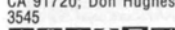
M.B. Raceway, 1031 Fremont, Alhambra, CA 91801; Tony or Dave, (818) 284-4198



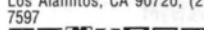
Merced R/C Auto Racers (MRCAR), 1652 W. North Bearcreek Dr., Merced, CA 95348; Ed Lopez, (209) 725-8040



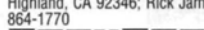
MnM Hobbies, 137 N. Vander, Corona, CA 91720; Don Hughes, (909) 272-3545



One-Stop Raceway, 3782 Cerritos Ave., Los Alamitos, CA 90720; (213) 493-7597



Outlaw R/C Hobbies, 7920 Webster, Highland, CA 92346; Rick James, (909) 864-1770



KEY TO SYMBOLS

- Indoor
- Outdoor
- Off-road
- Oval
- Dirt oval
- Carpet
- Concrete
- Asphalt
- On-site hobby shop
- AC power
- Auto lap-counting
- Food available

Track Directory

RAMS. Murco Plaza, Paseo Padre Pkwy., Mowry East, Fremont, CA; Mike Alton, (510) 490-8734



Ranch Pit Shop. 1655 E. Mission Blvd., Pomona, CA 91766; Billy Bowlerman, (909) 623-1506



RCRC Hobbies. 2069 Pacific Coast Hwy., Lomita, CA 90717; Rhea & Cliff Fisher, (310) 530-7272



Rick's R/C Speedway. 217 3rd St., Eureka, CA 95501; Rick Hynard, (707) 445-3341



Robin's Racing World. 1844 W. Glenoaks, Glendale, CA 91201; (818) 240-2093



Roy's Raceway. 368 E. 11th St., Tracy, CA 95516; (209) 836-3513



RP Hobbies. 6650 Commerce Blvd. 21, Rohnert Park, CA 94928; (707) 586-3375



Sacramento Mini-Wheels Raceway. 8711 Elder Creek Rd., Sacramento, CA 95828; Paul Schiager, (916) 383-4011



San Diego R/C Car Club. P.O. Box 232456, San Diego, CA 92193; (619) 560-0089



Scott's Practice Track. 1131 Ramona Dr., Mt. Shasta, CA 96067; Scott Cleveland, (916) 926-1012



So. Cal R/C Raceway. 11930 Valley View St., Garden Grove, CA 92645; Jim Blauvelt, (714) 892-0088



Square Roundhouse R/C Speedway. 1468 Lander Ave., Turlock, CA 95380; (209) 668-4454



SRS Raceway. 915 N. Main St., Salinas, CA 93906; (408) 424-4044



Tanforan Action Track. Tanforan Shopping Center, San Bruno, CA 94066; Jerry Imboden, (415) 583-2683



Team Air Racing Club. 18208 Imperial Hwy., Yorba Linda, CA 92686; Don or Nicky, (714) 579-7488



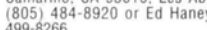
Tyler's RC/RD Racing Center. 6865 Flanders #D, San Diego, CA 92121; (619) 597-3072



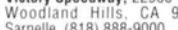
Valley R/C Race Park. 146 S. Santa Fe St., Hemet, CA 92344; Valley Wide Recreation, (714) 654-1505 or 658-4322



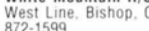
Ventura Road Runners/Freedom Park Raceway. 520 Freedom Park, Camarillo, CA 93010; Les Abramson, (805) 484-8920 or Ed Haney, (805) 499-8266



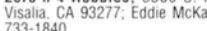
Victory Speedway. 22960 Victory Blvd., Woodland Hills, CA 91367; Bob Sarnelle, (818) 888-9000



White Mountain R/C Raceway. 174 West Line, Bishop, CA 93514; (619) 872-1599



Zero'n'4 Hobbies. 3360 S. Fairway, Visalia, CA 93277; Eddie McKay, (209) 733-1840



COLORADO

Colorado R/C Speedway. 6520 Wadsworth Blvd. #130, Arvada, CO 80003; (303) 425-1718



MHOR R/C Raceway. 15540 E. Batavia Dr., Aurora, CO 80011; Jess Brockman, (303) 343-0151



Miracle R/C Speedway. 4206 Wadsworth Blvd., Wheatridge, CO 80034; Rob Brossman, (303) 420-3051



R/C Mini Sports. 6401 Broadway, Unit G, Denver, CO 80223; John Weins, (303) 426-0110



R/C World & Track. 2788 S. Federal Blvd., Denver, CO 80236; (303) 789-0838



Rocky Mountain R/C Raceway. 5737 Constitution Ave., Colorado Springs, CO 80915; Lee Seigel, (719) 550-1777



CONNECTICUT

Craftech Raceway. Navsubase Nlon Box 14, Bldg. 460, Groton, CT 06349; Dave or Tony, (203) 449-3217



CT R/C Off-Roaders. behind Old Field School, Fairfield, CT 06430; Mike Belmonte, (203) 661-0145



Hobby World Raceways. 161-6 Woodford Ave., Plainville, CT 06062; (203) 793-1111



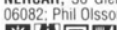
JP's Hobbies & Track. 54 Wakelee St. Ext., Seymour, CT 06483; (800) 547-5772



K/N R/C Speedway Inc., West St., Stafford Springs, CT 06076; (203) 684-9896



NERCAR. 36 Glendale Rd., Enfield, CT 06082; Phil Olsson, (203) 627-5410



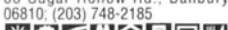
R/C Madness. 640 Enfield St., P.O. Box 64, Enfield, CT 06082; Christopher Marcy, (203) 741-6501



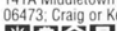
R/C Raceways Inc., 1265 John Fitch Blvd., South Windsor, CT 06074; (203) 528-3661



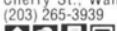
R/C World/Sugar Hollow Speedway. 66 Sugar Hollow Rd., Danbury, CT 06810; (203) 748-2185



SCORA/Clayton's Off-Road Racing. 141A Middletown Ave., North Haven, CT 06473; Craig or Keith, (203) 234-CLAY



Wallingford Indoor Racing. 63 N. Cherry St., Wallingford, CT 06492; (203) 265-3939



DELAWARE

Hobby Works Raceway. Hamlet Shopping Center, Dover, DE 19901; Steve or Gordon, (302) 674-9123



Kennedy's East Coast Speedway. 3118 West Dupont Hwy., Millsboro, DE 19966; Russ Kennedy, (302) 934-1708



Mills Raceway. RD 2 Box 83D-8, Milford, DE 19963; Mike Roe, (302) 422-6766



T&C Raceway. Rt. 113 South, Georgetown, DE 19947; Sam Thompson Jr., (302) 856-3804



T.N.T. Hobbies & Raceway. 609 Stein Hwy., Seaford, DE 19973-0464; Thorpe Shatney, (302) 628-0520



FLORIDA

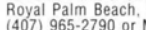
B+T R/C Central. 811 Playground Rd., Ft. Walton Beach, FL 32547; (904) 863-2666



Branford R/C Speedway. Rt. 3, Box 240, Branford, FL 32008; (904) 935-0758



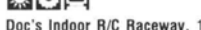
Challenger Speedway at the Willows. Willows Park & Okeechobee Blvd., Royal Palm Beach, FL 33414; Walt, (407) 965-2790 or Mark, (407) 790-6917



Coral Springs Roadrunners. P.O. Box 9632, Coral Springs, FL 33075; Tom Allison, (305) 721-0344 or Rick Schwartz, (305) 344-1983



Doc's Indoor R/C Raceway. 16803 US 19N, Clearwater, FL 34624; Steve "Doc" Wacholz, (813) 824-7702



5-fifty-5 Raceway. 125 Second Terrace West, Winter Haven, FL 33880; Chuck Nolke, (813) 324-7406



First Coast International Speedway. P.O. Box 1342, Jacksonville, FL 32201-1342; Bob Thompson, (904) 743-2161



FL Lauderdale R/C Speedways. 2201 NW 9th Ave., Mills Pond Park, Ft. Lauderdale, FL 33314; Jack or Diane Koons, (305) 424-6617



FYRE. 14160 Hwy. 441 (River Plaza), Tavares, FL 32728; Ray Salerno, (904) 357-1635



Gainesville R/C Speedway. 9311 SW 75 Way, Gainesville, FL 32608; Greg Rhodes, (904) 495-3600



Greater Orlando Auto Racers. 970 Keller Rd., Altamonte Springs, FL 32714; Dave Mottin, (407) 293-7090



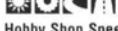
H&H Raceway. 4121 S. Tamiami Tr., Sarasota, FL 34231; (813) 922-7711



Hialeah Hobby Raceway. 4562 W. 12 Ave., Hialeah, FL 33015; (305) 826-3702



Hobby Shop Speedway. 4805 Hwy. 22, Panama City, FL 32404; Larry Pollock, (904) 763-4599



JARCAR Raceway. 7273 103rd St., Jacksonville, FL; Rob Kruse, (904) 272-6315



Kenny's Track & Hobby. 11125 U.S. 41 South, Gibsonton, FL 33534; Kenny Ryals, (813) 671-9123



Lake Whipoorwill International Speedway. 12345 Narcossee Rd., Orlando, FL 32827; Bob Hosch, (407) 277-9586; fax (407) 277-2568



Louie Burton's R/C Raceway. 4215 Mustang Rd., Lakeland, FL 33803; Louie Burton, (813) 665-1322



M&M R/C Raceway. 16921 Waterline Rd., Bradenton, FL 34202; Mike Williams, (813) 747-2889



Miami R/C Speedway. 12546 N. Kendall Dr., Miami, FL 33186; Jeff Mayorga or Pat Butler, (305) 271-3101



Miami Speedway. 7805 NW 148th St., Miami Lakes, FL 33014; Julio Romero, (305) 687-6728



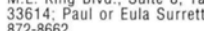
Ocala R/C Car Club. P.O. Box 70166, Ocala, FL 32670; Larry E. Mitchell, (904) 245-2609; Steve Shook, (904) 694-5147



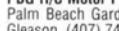
Oceanside Raceway. 206 E. Eau Gallie Blvd., Indian Harbour Beach, FL 32937; Michael Kelly, (407) 242-0434



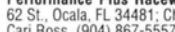
Paul's R/C Track & Hobby. 4511 Dr. M.L. King Blvd., Suite 8, Tampa, FL 33614; Paul or Eula Surrrette, (813) 872-8662



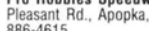
PBG R/C Motor Park. 6351 Barbara St., Palm Beach Gardens, FL 33410; Doug Gleason, (407) 743-9791



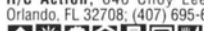
Performance Plus Raceway. 2820 SE 62 St., Ocala, FL 34481; Charlie Floyd or Cari Ross, (904) 867-5557



Pro Hobbies Speedway. 715 N. Lake Pleasant Rd., Apopka, FL 32712; (407) 886-4615



R/C Action. 646 Choy Lee Circle, Orlando, FL 32708; (407) 695-6746



Ray's Track & Hobby. 4605 W. Cayuga St., Tampa, FL 33614; (813) 872-8662



Rental Raceway. 3655 S. Hopkins Ave., Titusville, FL 32780; (407) 383-0631



River City R/C Car Club. 9711 Sharing Cross Dr., Jacksonville, FL 32257; Bill Fraden, (904) 268-1948



Southern Hobbies. 10 N. Magruder Ave., Orlando, FL 32805; Mike Spehn, (407) 521-7479



Southwest Florida R/C Raceway. 2425 Rivers Rd., Naples, FL 33964; Clyde Armstrong, (813) 455-1143



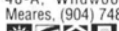
Space Coast Raceway. 563 Barton Blvd., #17, Rockledge, FL 32955; Bill Pinch, (405) 631-4373



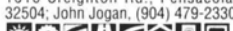
Sun Valley Speedway. Palmer Blvd., Sarasota, FL 34232; (813) 322-1200; (mailing address: Rt. 1, Box 443N, Myakka City, FL 34251)



Three Flags R/C Racetrack. Rt. 2, Box 48-A, Wildwood, FL 34785; Don Meares, (904) 748-3870



TJ's R/C Raceway & Hobby Shop. 1010 Creighton Rd., Pensacola, FL 32504; John Jogan, (904) 479-2330



Treasure Coast R/C Club. 4931 Oleander, Fort Pierce, FL 34982; Lou, (407) 464-3207



West Coast R/C Club. Lake Park, 17203 N. Dale Marry, Tampa, FL 33549; Tim O'Daffer, days, (813) 969-3683; evenings, (813) 239-9630



Wilbur Avenue Raceway. 1848 Wilbur Ave., Vero Beach, FL 32960; (407) 567-1200



GEORGIA

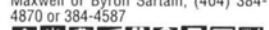
A.R.C. Raceway. 350 Shyrewood Dr., Lawrenceville, GA 30243; (404) 962-6194 or 962-8921



ARCAR Raceway. 6894 Buford Hwy., Doraville, GA 30340; Greg Coan, (404) 448-4533



Carnesville R/C Speedway. Rt. 2, Box 2354, Carnesville, GA 30521; Bobby Maxwell or Byron Sartain, (404) 384-4870 or 384-4587



Case R/C Raceway. P.O. Box 1061, Trenton, GA 30752; (404) 657-6789



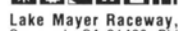
Dalton Raceway. 2300 Chattahoochee Rd., Dalton, GA 30270; (404) 226-6699



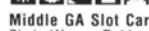
Georgia Hobby Center. 112 Kenwood Rd., Fayetteville, GA 30214; (404) 460-1753



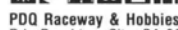
Good Life City Raceway. 6606 Newton Rd., Albany, GA 31707; (912) 888-2515



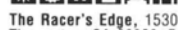
Lake Mayer Raceway. 1 Melinda, Savannah, GA 31460; Phil Hurd, (912) 355-6033



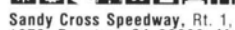
Middle GA Slot Car. 1805A Watson Blvd., Warner Robins, GA 31088; Larry Tucker, (912) 922-RACE



PDQ Raceway & Hobbies. 341 Senoia Rd., Peachtree City, GA 30269; Richard Burdett, (404) 631-1788



The Racer's Edge. 1530 Hwy. 19 N., Thomaston, GA 30286; Roger or Mark Walls, (706) 648-2637, (706) 648-6534



Sandy Cross Speedway. Rt. 1, Box 1073, Royst

IDAHO

Capital Dirt Burners, 1945 N. Teare Ave., Meridian, ID 83642; Jim Brandon, (208) 888-7079



Dapco Hobbies, 2211 Garrett Way, Pocatello, ID 83201; Pat Talbert, (208) 233-8163



Falls Hobbies & R/C Raceway, 1515 Northgate Mile, Idaho Falls, ID 83401; (208) 529-8650



MARA, 1229 Burrell, Lewiston, ID 83501; Rich Law, (208) 743-4141



Victory Speedway, 5416 Anna St., Boise, ID 83705; Bruce Wallace, (208) 343-3113



ILLINOIS

Adam's Blast Track, RR 1, Box 370, Ashmore, IL 61912; John Deffenbaugh, (217) 349-8447



AJ's Raceway, Kesslinger Road, Dekalb, IL 60115; A.J. Schultz, (815) 756-2772



Ameri-Trac, R3, Box 242, Mattoon, IL 61938; (217) 234-8707



Badlands II, 320 W. Jackson St., Vandalia, IL 62471; (618) 283-2913



BARR, 809 River Dr., Byron, IL 61010; Jim Haynes, (815) 234-5615



C&R Hobbies, 39 E. Jones, Milford, IL 60953; Ray Craighead, (815) 889-4073



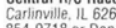
Centennial Park/LeMont Dirt Burners, 7827 Rohrer Dr., Downers Grove, IL 60516; Scott Moravik, (708) 968-6411



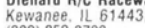
Central Illinois R/C Car Club, 7015 N. Knoxville Ave., Peoria, IL 61614; Wayne Thompson, (309) 693-8885 or R/C Workshop, 3100 S.W. Adams, Peoria, IL 61605; (309) 673-4860



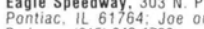
Central R/C Raceway, RR 2, Box 51-A, Carlinville, IL 62626; Tim Stewart, (217) 854-9718 or Don Rice, (217) 854-3785



Diehard R/C Raceway, 300 N. Main, Kewanee, IL 61443; Dick Jennings, (309) 852-3700



Eagle Speedway, 303 N. Plum St., Pontiac, IL 61764; Joe or Vickie Bachman, (815) 842-1738



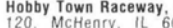
4-H Park Raceway, P.O. Box 774, Pontiac, IL 61764; Joe or Vickie Bachman, (815) 842-1738



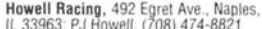
Hobby Raceway, 5027 4th Ave., Moline, IL 61265; Tony, (309) 755-5534



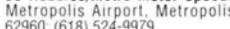
Hobby Town Raceway, 4611 W. Rt. 120, McHenry, IL 60050; Mike Hollingsworth, (815) 344-1777



Howell Racing, 492 Egret Ave., Naples, IL 33963; PJ Howell, (708) 474-8821



JC Hobbies/Metro Motor Speedway, Metropolitan Airport, Metropolis, IL 62960; (618) 524-9979



JMP Raceway, 952 Harrison Ave., Wood River, IL 62095; (618) 258-0297 or -0282



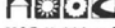
Lakeside Raceway, S. Germantown Rd., Brees, IL 62230; Scott Merian or Alan Poettiker, (618) 526-4861 or 654-2211



Leisure Hours Hobbies, 2872 Plainfield Rd., Joliet, IL 60435; (815) 439-1477



Lisle Community Park Raceway, 1825 Short St., Lisle, IL 60532; Jim Bernicky, (708) 416-6944



M&E Hobbies & Raceways, 300 N. Milwaukee Ave., Lake Villa, IL 60046; Mark Kaye, (708) 356-3224



Machesney Park, 1220 Shappert Dr., Machesney Park, IL 61115; (815) 282-1311



Magnum R/C Speedway, RR #2, Box 399, Danville, IL 61832; Terry & Nancy Dimes, (217) 446-2472



Marty's R/C Hobby, 1335 E. Broadway, Bradley, IL 60915; Gail or Marty, (815) 933-8441



Mercer Co. R/C Off-Road, RR 3 Box 259, Milan, IL 61264; Jamie Wagal, (309) 534-8324



Midwest Hobby Trax, 114 Kirkland Cr., Unit A, Oswego, IL 60543; Duane Pierson or John Koonce, (708) 978-1942



Monroe R/C Raceway, 26049 Ridgeland Ave., Monee, IL 60449; (708) 534-2422



Peoria R/C Raceway, 518 Hillsdale Ave., Peoria, IL 61604; Ray Tighe, (309) 672-1780



Precision Speedway, 3919 17 St., East Moline, IL 61244; Dan Kennedy, (309) 796-2226



R/C Speed Zone, 1400 E. Lafayette, Bloomington, IL 61701; (309) 662-1942



The R/C Track, 15022 S. Artesian, Harvey, IL 60426; Edmund Johnson, (708) 331-4079



Radio Active Raceways, 751 N. Bolingbrook Dr., #15, Bolingbrook, IL 60440; Jim or Lenny, (708) 759-7557



Redline Raceway, 921 Harding, Calumet City, IL 60409; (708) 862-8181



Rick's R/C Raceway, 122 W. 12th St., Streator, IL 61364; Rick Wallace, (815) 673-1870



Rockford Scale Raceway, 6900 N. 2nd St., Machesney Park, IL 61111; (815) 785-2970



SIRCAR Raceway, 1200 N. Marion, Carbondale, IL 62901; (618) 549-5885



Slot Wing Hobbies Race Place, 1615 W. Springfield, Champaign, IL 61821; (217) 359-1920



Smithton Community Park, P.O. Box 8152, Belleville, IL 62221; (618) 236-7569



Superior Raceway, 1706 W. Bradley, Champaign, IL 61821; (217) 359-8073



Thunderroad Speedway, Intersection of Broadway and Division, Coal City, IL 60416; (815) 634-8050



Tri-Star Racing, 3710 B. Hwy. 111, Pontoon Beach, IL 62040; Skip Bornmueller, (618) 931-1206



Valley Farms R/C Raceway, 706 Bypass 20, Cherry Valley, IL 61016; (815) 332-4516



INDIANA

Autograph/Race World, 231 Pendleton Ave., Pendleton, IN 46064; Sam Mudd, (317) 778-3386



BJ's Riverside Raceway, 265 S. Clay St., Jasper, IN 47546; Joe Lorey, (812) 482-3484



Blaze'n Race'n, P.O. Box 6, Hamlet, IN 46532; James Berndt, (219) 867-1324



Boone County Raceway, 1300 E. 100 S. Rd., Lebanon, IN 46052; Jerri Moss or Allan Luper, (317) 482-4827



CC Hobby & Speedway, RR 1, Box 68, Francesville, IN 47946; (219) 567-2447



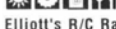
Classic Hobbies, 420 E. Commercial, Lowell, IN 46356; David Scheffler, (219) 696-0649



Clayhorn II, RR 4, Box 3521, Veedsburg, IN 47987; Mike Rogers, (317) 295-2582



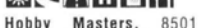
County Line R/C, 2333 W. State Rd. 38, Sheridan, IN 46069; Greg Welch, (317) 758-6393



Elliott's R/C Raceway, 2140 North Plate, Kokomo, IN 46901; (317) 452-0163



Hobby Barn Raceway, 1950 Springhill, Terre Haute, IN 47802-9694; (812) 299-5773



Hobby Masters, 8501 Bash, Indianapolis, IN 46250; Jim Price, (317) 576-1961



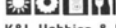
The Hobby Prescription, 115 S. Indiana Ave., Auburn, IN 46706; Roxanne Fike, (219) 925-6699



Hobby World Raceway & Hobbies, 1508 N. Harlan, Evansville, IN 47711; Jeff Wassman, (812) 421-1100



Jam Raceway, 261 E. Main St., Bunker Hill, IN 46914; Jami Casavan, (317) 689-7507



K&L Hobbies & Raceway, 3275 North 525W, LaPorte, IN 46350; (219) 324-0353



Main Hobbies, 625 Columbia, Lafayette, IN 47901; Randy Palmer, (317) 742-2045



Mooreville R/C Hobby, 7 Moore St., Mooreville, IN 46158; (317) 831-8877



Mooreville R/C Hobby, 9201 S. State Rd. 67, Camby, IN 46113; (317) 831-8877



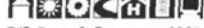
P&T Hobbies and Raceway, RR 2 (Hwy 60), Mitchell, IN 47446; Paul Weber, Tom Logsdon, (812) 849-6666; fax, (812) 332-0018



R/C Barn, 310 N. 125 W., Monroe, IN 46772; Mark Lengerich, (219) 692-6600



R/C World of Indiana, RR #2, Box 335, Lynn, IN 47355; (317) 874-2464



R/C Zone & Raceway, 6380 W. 34th St., Indianapolis, IN 46224; Russ or Greg, (317) 290-0067



Race St. Raceway & Hobby, 11261/2 Race St., New Castle, IN 47362; John or Nancy Strong, (317) 521-4888



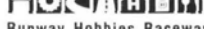
Raceway Park, 919 E. McKinley, Mishawaka, IN 46545; Bob Bean, (219) 256-1020



Radio Car Craft, 1925 S. Curry Pike, Bloomington, IN 47403; (812) 332-3245



The Rink, 7900 Whitcomb, Merrillville, IN 46410; Don Reiner, (219) 769-8113



Runway Hobbies Raceway, 5342 Elmwood, St. J. Indianapolis, IN 46203; Randy Hyatt, (317) 784-2421



TQ Hobbies & Raceway, 13710 Wicker Ave. (Rt. 41), Cedar Lake, IN 46303; Jack Wilson, (219) 374-9776



Winner's Circle Speedway, State Road 10 and 55, Roselawn, IN 46310; Harold Holmes, (219) 987-4106



IOWA

Barnyard Raceway, RR1, Box 243, Plainfield, IA 50666; Fred Good, (319) 276-4825



Devil's Valley, 919 4th Ave. So., Clinton, IA 52732; (319) 243-7516



Dubuque R/C Speedway, Dubuque County Fairgrounds, Dubuque, IA 52001; Paul Conlon, (319) 556-2736



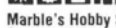
Hobby Haven Raceway, 7672 Hickman Rd., Des Moines, IA 50322; Brian Oakley, (515) 276-8785



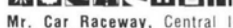
Kodiak Race Track, Box 78, Okoboji, IA 51355; Brad or Dave, (712) 332-7982



M&M Racetrack, 2434 Pilgrim Path, Oskaloosa, IA 52577; (515) 673-6265



Marble's Hobby Supply, 4685 SE 40th St., Des Moines, IA 50320; Rick Marble, (515) 262-7507



Mr. Car Raceway, Central Iowa Fairgrounds, Marshalltown, IA 50158; (515) 483-2234



North Park R/C Speedway, 805 S. Jerome, Algona, IA 50511; (515) 295-9352



Plymouth County R/C Speedway, 4th Ave., NE (Plymouth County Fairgrounds), LeMars, IA 51031; (712) 546-8788 or 546-9522



Power House Racing, 1200 S. Division St., Creston, IA 50801; (515) 782-4582 or 782-4174



Rotunda Raceway, 101 Bass, RR 1, Box 155A, Storm Lake, IA 50588; (712) 732-4555



Sibley Raceway, Osceola County Fairgrounds, Sibley, IA 51249; Allen Reck, (712) 754-2604



Southwest Iowa R/C Raceway, Kelly Park, Red Oak, IA 51566; (712) 623-5513



Southwest Iowa R/C Raceway, Montgomery County Fairgrounds, Red Oak, IA 51566; (712) 623-5513



Spenser R/C Raceway, 419 Grand Ave., Spenser, IA 51301; Steve or Mike, (712) 262-2603 or -7864



Team Johnson Speedway, Jct. Hwy. 34 & 406, West Burlington, IA 52655; (319) 753-0753



KANSAS

Chad's R/C World & Raceway, 217 Browne Ave., P.O. Box 76, Scranton, KS 66537; (913) 793-2313



Track Directory

East Kentucky Hobby Raceway, Hwy. 15, Garner Mt., Isom, KY 41824; (606) 633-8567

Fast Lane Hobbies & Raceway, 281 Porter Pike, Bowling Green, KY 42101; Greg Bailey, (502) 782-2419

Hobby Center Inc., 2106 Triplett St., Owensboro, KY 42303; Bobby Howell, (502) 683-7611

Hobbys Plus, 819 Main St., Hazard, KY 41701; Joe Mavaro, (606) 436-3175

The Lexington Autodrome Raceway, 2753 Richmond Rd., Lexington, KY 40509; (606) 269-7794

Lexington Model Shop Raceway, 211 New Circle Rd., Lexington, KY 40505; Billy Dent, (606) 293-2951

ProTrak R/C Racing, 3451 Cane Run Rd., Louisville, KY 40211; Tony Hardin, (502) 778-2657

Remote-Control Hobby Shop/Raceways, Rt. 8, Box 211, Mayfield, KY 42066; (502) 247-4715

River Cities Raceworld, 1104 Powell Ln., Flatwoods, KY 41139; (606) 836-CARS

Tri-City R/C Raceway, 2420 Riggall St., Ashland, KY 41101; Eddie Williams, (606) 324-6305

West Kentucky R/C Cars, 45 Hawkins Loop, Symsonia, KY 42082; (502) 851-3534

LOUISIANA

Acadiana R/C Hobbies & Raceway, 120 Toledo Dr., Lafayette, LA 70506; (318) 235-5825

Baha Raceways, 2225 Hickory Ave., Harahan, LA 70123; Bruce or Dan Rodriguez, (504) 737-6988

Cajun R/C Raceway, Rt. 2, Box 288 (Hwy. 343, Bosco) Church Point, LA 70525; Ray Thibodeaux, (318) 873-3855

Cajun R/C Raceway, 110 A Darbonne, Sulphur, LA 70663; Sandy Thibodeaux, (318) 527-9129

Johnny V's R/C Hobby & Raceway, 1036 W. Airline Hwy., LaPlace, LA 70068; Johnny V or Shawn Adams, (504) 651-9045

Loupe's R/C, 888A Madeline Ct., Baton Rouge, LA 70815; Mark Loupe, (504) 927-6275

Performance Hobby Raceway, 9135 W. Judge Perez Dr., Chalmette, LA 70004; Guy Trentecosta, (504) 271-2468

Red Dirt Raceway, 324 Pitkin Rd., Leesville, LA 71446; CJ Hall, (318) 535-9238

Red River R/C, 3232 East 70th, Shreveport, LA 71105; Pete Bradford or Ken Adcock, (318) 424-6325 or 929-7378

MAINE

Central Maine R/C Speedway, 18 Lithgow St., Winslow, ME 04901; David Prescott, (207) 877-2232

Clay Bowl R/C Hobbies, P.O. Box 61, Greene, ME 04236; Pat Cap, (207) 946-5003

Fast Track R/C Raceway, P.O. Box 247, Gardiner Rd., Sabattus, ME 04280; Raymond Nadeau, (207) 375-4779

Hobbys Plus, 479 Elm St., Biddeford, ME 04005; John Williams, (207) 282-8838

Lake Region R/C Raceway, Route 302, Bridgton, ME 04009; George Kosiavelan, (207) 647-8831

Mementos Hobby Shop, 86 Sweden St., Caribou, ME 04736; (207) 498-3711

Rocket R/C Hobbies, Annabessacook Rd., Winthrop, ME 04364; (207) 377-6910

Sanford Speedway, 479C Elm St., Biddeford, ME 04005; (207) 282-8838

The Racers' Club, 85 Hubbard Rd., Berwick, ME 03901; (207) 698-5337

Wallbanger Heaven, 50 Elm St., Houlton, ME 04730; Jack Newman, (207) 532-3169

MARYLAND

ABC Raceway, 2825 Ocean Gateway, Cambridge, MD 21613; (301) 228-4291

Bel Air R/C Raceway, 227G Gateway Dr., Bel Air, MD 21014; Jeff Little, (410) 838-1229

Cockeysville Astrodome, 10824 York Rd., Cockeysville, MD 21030; (410) 666-1098

Doug's Hobby Shop Raceway, 2935 Crain Hwy., Waldorf, MD 20601; (301) 843-7774

40 Speedway, 933 Pulaski Hwy., Havre de Grace, MD 21078; Doug or Vince, (410) 538-3135 or 939-3588

Friendship Off-Road Racers, 1531 Florida Ave., Severn, MD 21144; (301) 551-3050

Fruitland Indoor Race Center, 203 N. Fruitland Blvd., Fruitland, MD 21826; Thomas Duncan, (410) 543-4329

Maryland RCC Track, 4201 G.B. Road, Seabrook, MD 30725; James Holes, (410) 322-6125

Radio Control Cars Inc., 13600-A Annapolis, Bowie, MD 20715; Paul Fauth, (301) 262-1444

Suzie Goose Hobbies, 718 E. Gude Dr., Rockville, MD 20850; (301) 279-2966

The Track, 16806 Oakmont Ave., Gaithersburg, MD 20877; Mimi Wong, (301) 417-9630

MASSACHUSETTS

Archer's Lane R/C Raceway, 118 Washington St. (Rt. 1), S. Attleboro, MA 02730; (508) 399-6762

C&C Hobby & Raceway, 562 Russells Mills Rd., S. Dartmouth, MA 02748; (508) 997-4131

Centerline Hobbies, 167 Corporation Rd., Hyannis, MA 02601; (508) 771-1244

CKS Raceway, 46 Wilbraham St., Palmer, MA 01069; (413) 283-2260

Julio's Hobby & Speedway, 1275 Main St. (Rt. 109) Millis, MA 02054; (508) 376-1933

Megadrome Raceway/BRCCR, N. Adams Plaza, Rt. 8, North Adams, MA 01247; Gordon, (413) 663-9593; Richard, (413) 445-4777; Warren, (413) 442-2566

Mike's Speedway, 1210 Federal St. (Rt. 9), Belchertown, MA 01035; Steve or Mike, (413) 253-9312

Naytrix Raceway, Holmes Rd., Pittsfield, MA 01201; Rick Welch or Nate Zuckerman (413) 443-2488 or 443-9886

North East Auto Racers, P.O. Box 12, Merrimac, MA 01860; George Denault, (508) 346-8456

R/C Hobbies & Speedway, 562B Reed Rd., N. Dartmouth, MA 02747; Rick or Dave, (508) 991-5040

West St. Hobbies, 114C Main St., Medway, MA 02053; (508) 533-1231

MICHIGAN

AJ's Superspeedway, 347229 Wick, Romulus, MI 48174; Terry or AJ, (313) 942-9189

Baja Bayou Off-Road Raceway, 5313 W 22 Mile Rd., Tustin, MI 49688; Mike Langworthy, (616) 829-3447

Can-Am Hobbies Speedway Park, 1152 Gratiot, Marysville, MI 48040; Don Grinde, (313) 364-3338

Central Michigan R/C Raceway, 1270 James Savage, Midland, MI 48640; Mark Siebert, (517) 631-1488

Cereal City R/C Off-Roaders, 2000 E. Columbia Ave., Battle Creek, MI 49015; (616) 963-2506

Chatter Box Racing, P.O. Box 164, Old State Rd., Central Lake, MI 49622; Bill Altgott, (616) 544-9829

Dirt Slingers Raceway, 2460 S. M139, Benton Harbor, MI 49022; Tom Edwards, (616) 927-1431

DNR Speedways, 4630 Hill Rd., Harbor Beach, MI 48441; Kelcey, (517) 479-6097

Doug's Dirt Way, 5210 Colby Rd., Owosso, MI 48867; Doug Conn, (517) 723-3368

Elmer's R/C Speedway, 2683 Lakeshore Dr., Niles, MI 49120; Randy or Kristi Easton, (616) 683-7380

Farwell Park Raceway, 2781 E. Outer Dr., Detroit, MI 48234; Eddie McCray, (313) 967-0805

Fun Tyme High-Banked Oval, Fun Tyme Adventure Park, 6295 E. Saginaw Hwy., Grand Ledge, MI 48837; (517) 655-5503

Harrison International Speedway, 3519 N. Clare Ave., Harrison, MI 48625; John Starkweather, (517) 539-2921

JJ's R/C Speedshop, 5645 E. 13 Mile Rd., Warren, MI 48092; (313) 977-0420

JT Superspeedway, 825 Golden Ave., Battle Creek, MI 49017; Jerry or Dan, (616) 965-0571

Larry's Performance R/C's, 3430 Highland Rd., Waterford, MI 48328; Larry Rossi, (313) 683-5529

Ludington R/C Raceway, 1483 N. Dennis Rd., Ludington, MI 49431; (616) 843-4654

Mason County R/C Car Track, West Shore Community College, (611 N. Washington Ave., Ludington, MI 49431) Scottsville, MI 49454; (616) 843-8553 or 843-4837

MC-RC Raceway, 4601 Page Ave., Jackson, MI 49203; Sam Sprang, (517) 787-9161

Mikey's Raceway, 7 North St., Yale, MI 48097; Mike Huber, (313) 387-4308

NMRCC Raceway, 110 N. Ostego, Gaylord, MI 49735; Ed Schneider, (517) 732-3963

Pointe R/C, 2119 Summertown Rd., Mt. Pleasant, MI 48858; Frank, (517) 773-5711

R&B Raceways, P.O. Box 24, St. Louis, MI 48880; Russ or Brian Weaver, (517) 681-3688 or (517) 463-1886

R&L Hobbies, 9782 Portage Rd., Kalamazoo, MI 49002; Rex Simpson, (616) 323-3686, fax (616) 329-1744

R&S Hobbies & Raceway, 230 Mill St., St. Louis, MI 48801; Rich Beard or Scott Davis, (517) 681-3463

Rad & Bad Raceway, 810 S. Martin Rd., Gladwin, MI 48624; Mick Bushong, (517) 426-4373

Radio Wave Hobbies, 14000 Old 14 Mile Rd., Greenville, MI 48838; (616) 754-2170

Rider's Superspeedway, 42040 Koppnick, Ste. 400, Canton, MI 48187; Brent Martin, (313) 451-5599

Rider's Superspeedway, 4415 S. Westledge, Kalamazoo, MI 49008; Ken Penn (616) 349-2666

T/A Raceway, 119 N. Michigan, Big Rapids, MI 49307; Harvey, (616) 796-3217

Thumb Raceway, 3441 S. Main St., Marlette, MI 48453; (517) 635-7848

TNT R/C Raceway, 130 W. Washington St., Marquette, MI 49855; Gregory Berg, (906) 228-4098

USA Raceways, 6803 Dixie Hwy., Bridgeport, MI 48722; (517) 777-7054

Village Hobbies-n-Crafts, 17824 N. Maple Island, Hesperia, MI 49421; Alan or Fran, (616) 854-1374

MINNESOTA

ABC Raceway, 120 2nd St. NW, Pipestone, MN 56164; Ross Lange, (507) 825-5065

Caeson Sport & Hobby, 312 N. Bdwy, Crookston, MN 56716; Caesar Kaiser, (218) 281-6665

Dr. Skate's R/C Raceway, Frontage Road, La Crescent, MN 54601; Gary Behrens, (608) 788-6141

Greater Minnesota Racin' Place, 3302 Southway Dr., St. Cloud, MN 56301; Jon Jackson, (612) 252-9768

Minn-E-Golf & Hobby, 9100 Park Ave., Elk River, MN 55330; (612) 441-8365

The PBR Off-Road Rally, 721 Cedar Ave., Hector, MN 55342; Philip Zempel, (812) 848-2129

Range Racing World, Inc., 412 Jones St., Eveleth, MN 55734; Bill, (218) 744-4423

Squid's R/C Autos, 924 Main Avenue, Moorhead, MN 56560; Jeff Greenwell, (218) 233-3554

Trackside Racing, 2300 Myrtle Ave., St. Paul, MN 55114; Winton Offelie, (612) 644-3424

Wild West R/C Speedway, 2822 Piedmont Ave., Duluth, MN 55811; Roger Deloach, (218) 727-6248

MISSISSIPPI

Crossroads Raceway, Mall of Corinth, Rt. 1, Box 1, Corinth, MS 38834; (601) 287-2110

Dixieland R/C Speedway, 2535 Tabernacle Rd., Columbus, MS 39702; Jeffrey Alvey, (601) 328-9429

Fast Freddy's Raceway, 20390 Hwy. 49, Saucier, MS 39574; Mark Payne, (601) 832-0315

Joe McFadden Hobbies, 1619 51st Ave., Meridian, MS 39307; Joe McFadden, (601) 483-7000

Norm's R/C Hobbies, 602 W. Old Pass Rd., Long Beach, MS 39560; Norm, (601) 863-0524

Small Cars Unlimited, 820 Cooper Rd., Jackson, MS 39212; (601) 372-FAST

MISSOURI

All Seasons Hobby, 152 O'Fallon Plaza, O'Fallon, MO 63366; Bob Daniels, (314) 281-8767



Blue Speedway, 12019 E. 47th St., Kansas City, MO 64133; Mark Randol, (816) 358-0238



Doug's Hobbies, 5221 Veil of Tears, Jefferson City, MO 65109; (314) 893-5861



Fast Eddie's, 10 S. Coffman, Flat River, MO 63601; Eddie Smith, (314) 431-3303



Fast Trax Racing Assoc., 212 N. Luluwood, Springfield, MO 65082; Ken Pope, (417) 831-5046



Gateway R/C Track & Hobbies, 255 Marshall Rd., P.O. Box 345, Valley Park, MO 63088; (314) 225-5844



Harrisonville Hobby Shop & Raceway, 2301 S. Commercial, Harrisonville, MO 64701; Richard Taylor, (816) 887-3055



Hobbies 'n' Stuff Raceway, 102 W. Pearce Blvd., Wentzville, MO 63385; John Gerhardt, (314) 327-6006



Lafayette Riverside Raceway, P.O. Box 9663, Marshall Rd., Kirkwood, MO 63122; Don Laningham, (314) 966-8912



Owensville Raceway, Hobby Shop & More, 115 N. First St., Owensville, MO 65066; Mike Brune, (314) 764-3461



Ozark Hobby, Rt. 6, Box 248-3, Ozark, MO 65721; Deborah Adkisson, (417) 485-4552



Pavey R/C Raceway, 2199 Meadow, Barhart, MO 63012; Jerry Benz, (314) 464-8627



R+ Hobby, 590 Jungemann Rd., St. Peters, MO 63376; (314) 928-9838



S&P Performance Shop, 5383 Highway "N," St. Charles, MO 63304; Paul Lund, (314) 447-5252



Suppenbach Winter Racing, Route 5, Box 66, Pleasant Hill, MO 64080; Larry Suppenbach, (816) 987-5828



MONTANA

Bozeman R/C Powerhouse Track, west side of the Main Mall, Bozeman, MT 59715; (406) 586-6461



Garden City Raceway, 118851/2 Hwy. 93, Lolo, MT 59847; Dave Erickson, (406) 273-2776



Hobbytown Raceway, 17 Tai Lane, Bozeman, MT 59715; Tom Duncan, (406) 587-3512



Magic City R/C Raceway, 14th St. W. & Central Ave., Billings, MT 59101; (406) 259-9004



Pockets Raceway, Montana State Fairgrounds, Great Falls, MT 59405; Greg Vetter, (406) 761-7279



Stormer Raceway, 23 High Speed Road, Glasgow, MT 59230; Mike Stormer, (406) 228-4569



NEBRASKA

Hobby Town USA, Park Island Square, 3537 W. 13th St., Grand Island, NE 68803; Ed Conroy, (308) 382-3451



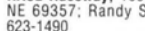
On-Road Raceway, 315 S. 74th St., Omaha, NE 68114; Doc Holiday, (402) 392-1126



Over the Wall Gang, Higiroadbee Speedway, 401 Market Pl., Norfolk, NE 68701; Matt Moeller, (402) 379-0879



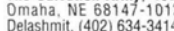
RACE Raceway, 100757 Rd. J, Mitchell, NE 69357; Randy Schamaman, (308) 623-1490



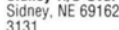
Riverside Raceway, Hwy. 77 South, Fremont, NE 68025; Jeff Richter, (402) 721-3379



The Salvation Army, 4032 Harrison St., Omaha, NE 68147-1012; Lt. Michael Delashmit, (402) 634-3414



Sidney R/C Oval Racers, 932 10th Ave., Sidney, NE 69162; Gale Talich, (308) 254-3131



NEVADA

AMS R/C Raceway, 1130 Icehouse Ave., Sparks, NV 89431; Terry Ramsey, (702) 355-8803



Little City Hobbies Raceway, 640 Kuenzki, Reno, NV 89503; shop, (702) 786-3611 or Bill Avery, (702) 358-7629



Western R/C, 6404 Richmar, Las Vegas, NV 89139; Randy Grigg or Mitch Strete, (702) 897-7227



NEW HAMPSHIRE

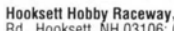
Fastracker Club, 520 Washington St., Keene, NH 03431; Bill Phillips or John O'Connor, (603) 352-0811 or 357-8393



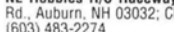
4-K Racing, 100 Warwick Rd., Winchester, NH 03470; (603) 239-6207



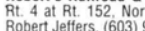
Hobby Etc., Heritage Place, Rt. 101A, Amherst, NH 03031; (603) 595-8549



Hooksett Hobby Raceway, 1328 Hooksett Rd., Hooksett, NH 03106; (603) 625-2420



NE Hobbies R/C Raceway, 49 Eaton Hill Rd., Auburn, NH 03032; Chuck Theriault, (603) 483-2274



Robert's Railroad & Hobbies, Box 431, Rt. 4 at Rt. 152, Northwood, NH 03261; Robert Jeffers, (603) 942-5193



NEW JERSEY

Al & Rich's R/C Speedway, 90 S. White Horse, Hammonton, NJ 08037; Ray Murray, (609) 561-7584



Dave Bicknell Memorial Raceway, P.O. Box 914, Absecon, NJ 08201; Rob Caruso, (609) 748-8291



PRO-LINE

In 1990, Pro-Line developed the original Mini-Pin tire design to give extra traction on harder surfaces. The first major success with this new tire came in 1991, at the Winter Championships in Florida. The Mini-Pin design dominated racing at the Championships in all classes. Almost a year later, Pro-Line introduced the Ultra Mini-Pin design—the "Fuzzie" tire—which provided even more traction in harder conditions. With the introduction of the Fuzzie, Pro-Line began researching a new, softer compound that would combine adhesion characteristics with hard-surface tire-tread designs.

The XTR Compound was perfected just before the opening of the 1992 racing season. Combined with Pro-Line's Mini-Pin designs, the XTR Compound surpassed all expectations. The compound provided more traction on hard dirt and clay tracks—more traction than any other product on the market. The results of this introduction were amazing. XTR Compound Tires were used on every Modified Off-Road and Truck National Championship winner in 1992.

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XTR's Winning Tradition Continues...

- '93 Winter ChampionshipsTruck Modified
Mark PavidisPro-65 XTR and Pro-90 XTR combination
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Brad ReelfsPro-83 XTR "Flat Fuzzie"
- '93 Winter Championships4WD Modified
Jürgen LautenbachPro-135 XT and Pro-82 XTR combination
- '93 Reedy Race of Champions2WD and 4WD Modified Invitational
Masami HirosakaPro-83 XTR and Pro-80 XTR
- '93 Reedy Race of Champions2WD and 4WD Modified Open
Scott HughesPro-82 XTR and Pro-83 XTR
- '93 Pro-Line Cactus ClassicTruck Modified
Jon AndersonPro-90 XTR
- '93 Pro-Line Cactus Classic4WD Modified
Mark FrancisPro-135 XT and Pro-83 XTR
- '93 Reedy Truck ChallengeTruck Modified
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This compound excels on hard- to medium-packed dirt and clay conditions. It will continue to dominate almost any track under such conditions. Choose the tires that are finishing first around the country—Pro-Line XTR!

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Track Directory

EMC Tracks & Trains, 1235 Rt. 23 South, Wayne, NJ 07470; (201) 628-4838



Family Hobbies Raceway, NW Blvd. & Weymouth Rd., Vineland, NJ 08630; Linda Vogel, (609) 696-5790



Golden Hobbies & Crafts, 415A Erial Rd., Pine Hill, NJ 08021; (609) 782-1222



Jackson R/C Racing, Marshall Ave., Jackson, NJ 08527; (908) 905-1593



LBRA Track, 392 Warburton Pl., Long Branch, NJ 07740; (908) 222-5122



Parlor Hobbies, 34 Broad St., Matawan, NJ 07747; Charlie Roder, (908) 566-3158



Pit Stop Dragway, Campus Rd., Totowa, NJ 07512; Kimberly Frank, (201) 942-5955



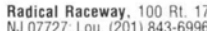
Pixley International Speedway, 763 Peters Dr., P.O. Box 189, Martinsville, NJ 08836; Richard Toole, (908) 560-0399



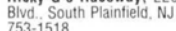
The Race Place, 1151 Hwy. 33, Farmingdale, NJ 07731; John Fary, (908) 938-5215



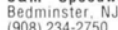
Radical Raceway, 100 Rt. 17S, Lodi, NJ 07727; Lou, (201) 843-6996



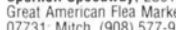
Ricky G's Raceway, 2208A Hamilton Blvd., South Plainfield, NJ 07080; (908) 753-1518



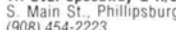
S&M Speedway, 4 Feild Rd., Bedminster, NJ 07921; Lee Spano, (908) 234-2750



Spennell Speedway, 2301 Rte. 9 North, Great American Flea Market, Howell, NJ 07731; Mitch, (908) 577-9191



Tri-Oval Speedway & R/C Center, 296 S. Main St., Phillipsburg, NJ 08865; (908) 454-2223



Truck Challenge, 1162 Rt. 202-206 N., Bridgewater, NJ 08807; Michael Gill, (908) 658-9616



Zeppelin Hobbies, 92 Rt. 23N, Riverdale, NJ 07457, Lou Ballini, (201) 831-7717



NEW MEXICO

Hobby Connection Raceway, 1713 Indian Wells Rd., Alamogordo, NM 88310; Terry Billings, (505) 437-0885



Roswell R/C Raceway, 1004 N. Greenwood, Roswell, NM 88201; Larry Jumper, (505) 623-6693



TRC Race Park, 1303 E. 8th St., Truth or Consequences, NM 87901; Gary Whitehead, (505) 894-3211



NEW YORK

A&D's FastTracks, 1000 N. Main St., Brewster, NY 10509; (914) 279-2065



A&S Race Center & Hobbies, 120 Cayuga St., Canalview Mall, Fulton, NY 13069; (315) 598-2772



Adirondack International, 66 Elm St., Warrensburg, NY 12885; Matt or Jake Wiedman (518) 623-9611



Aldon Speedway, 100 Castle St., Geneva, NY 14456; (315) 789-8343



Brockport Speedway, 6000 Sweden Walker Rd., Brockport, NY 14420; Gil & Betty Glidden, (716) 637-6224



Brownie's Pro & Sport Hobbies, 124 Bennett St., Staten Island, NY 10302-1426; John Brown, (718) 277-2194



Cars, R/C & Guitars, 4360 Seneca St., West Seneca, NY 14224; (716) 674-0905



Capital District R/C Racers, 27 Venus Dr., Albany, NY 12205; Keith Green, (518) 783-7859



Catskill Regional R/C Raceway, Glasco Turnpike, Mt. Marion, NY 12456; (914) 339-3294



Central New York R/C Auto Racers, Martin St., P.O. Box 116, Rome, NY 13440; John Orr, (315) 336-5140



Chipmunk Hill R/C Speedway, 217 Pine St., Theresa, NY 13961; Ted House, (315) 628-5065



Creekside R/C Raceway Park, 5242 Route 228, Trumansburg, NY 14886; Lawrence C. Urdike, (607) 387-5513 after 6 pm.



D&J's Speedway, 94 Maple St., Croton-on-Hudson, NY 10520; Dan Spatta, (914) 271-5797



Daytona Miniature Raceway, 59 Lamar St., W. Babylon, NY 11704; (516) 491-4041



Dirt Track, 17 Fairway Dr., Manorville, NY 11949; Billy Wroblewski, (516) 878-0737



Electric City Speedway, 955 State St., Schenectady, NY 12307; Jim Delyser, (513) 372-7920



Enjoyable Hobbies and Raceway, 260 Ronkonkoma Ave., Lake Ronkonkoma, NY 11779; (510) 588-6994



Foothills R/C Racing Club, RD 1, Box 1156, Maryland, NY 12116; Steve Valentine, (607) 433-1860 or 432-7508



Gamlen's R/C Motor Speedway, 8453 Rt. 11, P.O. Box 1430, Cicero, NY 13039; Mike Woods, (315) 699-2991



GP Racing, 6785 Martin St., Rome, NY 13440; Greg Phillely, (315) 336-5140



HobbyTown USA, 629 Plank Rd., Clifton Park, NY 12065; Larry Burwell, (518) 383-1215



Lakeside Raceway & Hobbies, 712 Willow Ave., Ithaca, NY 14850; (607) 272-0248



Latest Hobbies & Raceway, 781 Rt. 25A, Rocky Point, NY 11778; Joe Jolin, (516) 929-8844, fax, (516) 929-5002



LI 1/4-Scale Racers, 63 Horton Dr., Huntington Station, NY 11746; (516) 351-5384



Maspeth Raceway, Rust St. & 57 Rd., Maspeth, NY 11378; Walter, (718) 897-7921



Mattituck Hobbies & R/C Raceway, 7335 Main Rd., Mattituck, NY 11952; Wally, (516) 298-2020



Norwood Hobbies Raceway, 2-4 S. Main St., Norwood, NY 13668; Tom Jarvis, (315) 353-6621



Performance Hobbies Raceway, 205 North Ave., Webster, NY 14580; Anthony Cenzi, (716) 621-1274



Performance Plus R/C Speedway, The Hobby House, 1141/2 Jones & Gifford Ave., Jamestown, NY 14701; (716) 488-1772



Queens Off-Roaders, 42-12 13th St., Long Island City, NY 11101; (718) 392-5766



R/C Competition Corner, K-Mart Plaza, Mattytade, NY 13211; (315) 455-8718



R/C Hobbies, Rt. 49, Box 138, Constantia, NY 13044; Roy Catholici, (315) 623-9536



R/C World Hobby Center, 69-57 Juniper Blvd. S., Middle Village, NY 11379; (718) 326-0002



R&S Hobbies, 356 Macedon Ct. Rd., Fairport, NY 14502; (716) 425-3722



Race O Rama, 44 Sharon Ave., Plattsburgh, NY 12901; James Varno, (518) 562-5442 or 643-2678



Rampage R/C, 53-57 Beadart Pl., Hyde Park, NY 12538; Brian Walker, (914) 229-2456



Ransomville, R/C Raceway, 2576 Academy St., Ransomville, NY 14131; Irene Preisch, (716) 791-8310



Rock River Model Hobbies, RD 2, Box 297, Rock River Rd., Interlaken, NY 14847; Carl Schmidt, (607) 532-9489



Schoharie Co. R/C Car Club, P.O. Box 126, Cobleskill, NY 12043; (518) 234-4600



Seneca R/C, 2339 Yerkes Rd., Romulus, NY 14541; (315) 789-8343



Skaneateles Raceway & Hobby, P.O. Box 102, Rt. 20, W. Genesee St., Skaneateles, NY 13152; (315) 685-8077



Small Torque Racers of Long Island, 24 Horton Dr., Huntington Station, NY 11746; George Franz, (516) 271-1119



South Shore Hobby & Raceway, 311 W. Roe Blvd., Patchogue, NY 11772; Don Hauck, (516) 758-5567



Southern Tier Raceway & Hobbies, 88 Paige St., Owego, NY 13827; Chet or Anita Harding, (607) 687-5395



Team Earthquake, The Hobby House, 1141/2 Gones & Gifford, Jamestown, NY 14701; (716) 488-1772



Transit Speedway & Hobbies, 5319 Transit Rd., Depew, NY 14043; (716) 684-7368



Ulster County Speedway, P.O. Box 71, New Paltz, NY 12561; Joe Colombo Jr., (914) 754-7664



Wall's Hobby, 2 Dwight Park Dr., Syracuse, NY 13209; (315) 453-2291



Western New York R/C Speedway, 58 Spring St., Cuba, NY 14727; Jason Congdon, (716) 968-3586



Whitestone Off-Road Raceway, 149-50 15th Rd., Whitestone, NY 11357; Whitestone Hobbies, (718) 767-6767



NORTH CAROLINA

B-n-B R/C Raceway, 7805 S. Airazona Dr., Raleigh, NC 27604; Craig Barber, (919) 878-8407



Badin Shore Raceway, 1730 Jackson Lake Rd., High Point, NC 27263; Jimmy or Tim Martin, (919) 431-9258



Big Kids Little Toys, 407-B Pomona Dr., Greensboro, NC 27407; Joe Stewart, (919) 299-3355



C&H Raceway, 1400 N. Cannon Blvd., Kannapolis, NC 28083; Camera & Hobby Shop, (704) 933-5321



Cape Fear Speedway, 207 Harley Rd., Wilmington, NC 28401; Bob Justice, (919) 762-1184



Carolina R/C Drag Assoc., 907-C Warsaw Rd., Clinton, NC 28328; (919) 592-9489



Carolina Hobbies R/C Raceway, Route 1, Box 158, Taylorsville, NC 28681; Kim & Roseanne Kulawik, (704) 495-4040



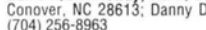
Clapp's R/C Motor Speedway, Rt. 4, Box 300A, Siler City, NC 27344; Al Clapp, (919) 663-3198



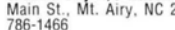
Clinton R/C Raceway, 907-C Warsaw Rd., Clinton, NC 28328; Corbitt Marshburn (919) 592-9489



Dan's R/C Raceway, Rt. 4, Box 392A, Conover, NC 28613; Danny Dellinger, (704) 256-8963



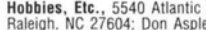
Granite City R/C Raceway, 192-1 N. Main St., Mt. Airy, NC 27030; (919) 786-1466



Hi-Performance Hobbies & R/C Raceway, P.O. Box 320, Earl, NC 28038; Derrell Hollifield, Steve Bliss, (704) 482-4391



Hobbies, Etc., 5540 Atlantic Springs, Raleigh, NC 27604; Don Asplen, (919) 790-1444



Hobby Park, W. Clemmonsville Rd., Winston-Salem, NC 27103; Dick Butler, Parks & Recreation, (919) 727-2063



The Hobby Speedway, Hwy. 25, P.O. Box 279, Naples, NC 28760; Jerry or Kelda Bowers, (704) 684-9814



Joe's Hobby Shop & Raceway, Rt. 2, Box 682-B, Bessemer City, NC 28016; (704) 435-2912



Jacksonville International Raceway, E. Thompson St., Jacksonville, NC 28540; Penny, (919) 346-1522



Mega Track of the Triad, 5540-105 Atlantic Springs Rd., Raleigh, NC 27604; Don Asplen, (919) 790-1444



Motorlead R/C Raceway, 125 Park St., Canton, NC 28716; (704) 648-7911



Mountain R/C Raceway, Hwy. 107N, P.O. Box 67, Glenville, NC 28736; (704) 743-3709



Outlaws Fastrac Hobbies Raceway, 1013 Old Hendersonville Hwy., Brevard, NC 28712; Jeff Laws, (704) 885-RACE (7223)



PC Hobbies, 143 Industrial Dr., King, NC 27021; Mike Ingles, (919) 983-2514



Hacienda Hills Speedway, 20 Hacienda Hills, Minot, ND 58701; Kenny Duchscherer, (701) 839-4419



Northern Mini Racers, P.O. Box 415, Minot, ND 58702; Patrick McWethy, (701) 839-8868



OHIO

AAAction Speedway, P.O. Box 6, Morral, OH 43337; Tim McKnight, (614) 465-9891 or Bill Harris, (614) 387-5912



A&D R/C Raceway, 5096 Rt. 127 S., Eaton, OH 45320; Aaron Garrett, (513) 452-1662



Aerotek Raceway, 409 Applegrove Rd., North Canton, OH 44720; (216) 499-1300



Alcraft's R/C Raceway, 1370 Custer-Orangeville Rd., Brookfield, OH 44403; (216) 448-1573



Alternative Racing Association, Canton R/C Speedway, 2600 17th St., East Canton, OH 44730; Neal Everhart, (216) 484-2587



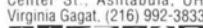
Bryan Thunderdome, Townline Rd., Bryan, OH 43506; Jeff Lehmann, (419) 636-9100



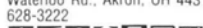
Buckeye Pulling Tracks, State Rt. 68, Xenia, OH 45385; Mark Hartings, (513) 376-8334



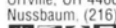
C/R Hobbies Top Race Track, 323 Center St., Ashtabula, OH 44004; Virginia Gagat, (216) 992-3833



Classic Hobbies & Raceway, 2845 W. Waterloo Rd., Akron, OH 44312; (216) 628-3222



D&J R/C Raceway, 801 W. Market St., Orrville, OH 44667; Don Yoder or Mark Nussbaum, (216) 682-4266



D&S Hobbies Raceway, 7701 Crile Rd., Concord, OH 44077; (216) 354-2112



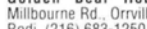
FFA Speedway, 1001 Old Columbus Rd., Wooster, OH 44676; Roger Franks, (216) 264-1848



Flag City Raceway, 721 Rockwell Ave. (track address: 3772 C.R. 18), Findlay, OH 45840; Ruth Hubbard, (419) 422-5589



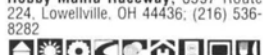
Golden Bear Hobbies, 154 N. Millbourne Rd., Orrville, OH 44667; Bob Rodi, (216) 683-1250



Hi Tech Hobbies II, 116 S. Taylor St., Loveland, OH 45140; Rick Lewis or Richard Kosar, (513) 683-8900



Hobby Mania Raceway, 6597 Route 224, Lowellville, OH 44436; (216) 536-8282



Innovative Hobbies/Lakeside Speedway, 3427 Manchester Rd., Akron, OH 44319; (216) 645-1333



JB Hobby & Raceway, 8760 St. Rt. 201, Tipp City, OH 45371; Bob Curtis, (513) 845-8222



KAR R/C Raceway, 14511 Seacrist, Salem, OH 44460; Reid Tarves, (216) 537-4039



Lewisburg R/C Raceway, 395 US Rt. 40E, Lewisburg, OH 45338; Gene Butler, (513) 678-9201



Medina City R/C Raceway, 3414 Remsen Rd., Medina, OH 44256; Eric Pesto, (216) 723-0255



Midway Racetrack, 2601 Ashland Rd., Mansfield, OH 44905; Greg Jones, (419) 589-4200



Parma Speedway, 5729 Ridge Rd., Parma, OH 44129; Sam Belsito, (216) 845-3706



Paulding R/C Speedway, 103 N. Main, Paulding, OH 45879; Virgil Simindinger, (419) 238-0633



The Racer's Choice R/C Hobbies & Raceway, 1298 US Rt. 42, Mason, OH 45040; (513) 398-5539



RBI R/C Speedway, 110 Springdale Ave., Wintersville, OH 43952; Frank Luckino, (614) 264-9101



Right Choice Hobbies, 7760 Garrison Ave., Cincinnati, OH 45247; (513) 353-3343



Sleepy Hollow Raceway Park, 11189 Spear Rd., Concord, OH 44077; Gary Waldheim, (216) 944-5898



Strongsville Speedway, 13315 Prospect, Strongsville, OH 44136; (216) 572-0430



Trusso's R/C Raceway, 100 W. Crain Ave., Kent, OH 44240; Bill, (216) 673-0422



Way Out Hobbies, 5583 Centerpoint Rd., Georgetown, OH 45121; (513) 375-4984



Woodlane Raceway, 2300 E. Dorothy Lane, Dayton, OH 45420; Jeff Simpson, (513) 298-1166



Y-City Hobby & Speedway, 120 S. 6th St., Zanesville, OH 43701; Kevin McKenna, (614) 455-3025



OKLAHOMA

Ace Raceway, 2608-76B Villa Prom. (Shepherd Mall), Oklahoma City, OK 73107; Mike McLish, (405) 947-5937



Adams Creek R/C Speedway, 5207 S. 194th E. Ave., Broken Arrow, OK 74014; John Beighle, (918) 355-1416



Coweta Hobby & Speedway, 310 S. Broadway, Coweta, OK 74429; Derald Seabolt, (918) 486-3948



Off-Road Car Assoc. of Tulsa, 9720 Swan Dr., Broken Arrow, OK 74014; George Gooch, (918) 486-4528



R/C Auto Racing, 501 Westland Dr., Edmond, OK 73034; Gary Garrett, (405) 348-9253



RCRC, 400 S. Vermont, Suite 104, Oklahoma City, OK 73108; Rick or Steve, (405) 947-7223



Sundown Raceway, 526 Virginia Ave., Ponca City, OK 74601; Ryan Trant, (405) 765-2832



Wild Country Speedway, 127 South Main, Porter, OK, 74454; Charles McCollough, (918) 685-0372 or 687-1686



OREGON

Competition Racing Assoc., 17941 NE Glisan, Portland, OR 97230; Mark Taylor, (503) 257-0796



Fast Track Recreations, 18023 SE Addie Rd., Milwaukie, OR 97267; Dale Nielson, (503) 659-7661



The Finish Line R/C Raceway, 560 W. 'O' St., Apt. 6, Creswell, OR 97426; Rod Carothers, (503) 895-4395



Hobby Center, 1740 Geary St. SE, Albany, OR 97321; Ron Juhnke, (503) 928-5255



Mt. Bachelor Radio Raceways, 225 Century Dr., Bend, OR 97701; Rex Baldwin, (503) 389-6160



North Lawrence Raceway, 36 N. Lawrence, Eugene, OR 97401; Gary Hill, (503) 484-9857



R/C Plus Hobbies Raceway, 2029 25th St. SE, Salem, OR 97302-1130; Ron Smith, (503) 364-9188



R/C Speed Center, 2810 N. Pacific Hwy., Medford, OR 97501; (503) 779-8298



Yamhill County R/C Car Club, 722 Morgan Ln., McMinnville, OR 97128; Larry Rucker, (503) 472-7234



PENNSYLVANIA

A-1 R/C Speedway, 15 S. Hanover St., Hummelstown, PA 17036; Clyde Felker, (717) 566-3335



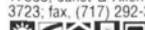
Ansolan, 54 High St., Fairchance, PA 15436; Timothy Abraham, (412) 564-9956



B&B Raceway, 252 Geiger Rd., Philadelphia, PA 19115; Rod Smith, Doug or Dave Bruestle, (215) 686-6086



BJ's Hobbies & Raceway, 570 E. Camping Area Rd., Wellsboro, PA 17365; Janet & Allen Wiley, (717) 292-3723; fax, (717) 292-3584



Brian's Raceway, 733 Flexer Ave., Allentown, PA 18103; (215) 435-1862



CEB Motors R/C Div., 5743 Molly Pitcher Hwy., Marion, PA 17235; Charlie Booze, (717) 375-4635



Clearfield R/C Car Club, P.O. Box 297, Clark Hill Rd., Hyde, PA 16843; Joe Welch, (814) 765-3045



Cressona Mall Speedway, Rt. 61, Pottsville, PA 17901, (717) 385-3506



Curly's Hobby Shop, 4455 W. Ridge Rd., Hickory Plaza, Erie, PA 16506; (814) 835-1134



DARCAR, RD 1, Box 290, DuBois, PA 15801, (814) 375-0687



DC Ultra Oval, 13 York Rd., Warminster, PA 18974, (215) 672-5200



Denwick R/C Hobbies & Raceway, 5601 Lincoln Way East, Fayetteville, PA 17222; Charles Gardenhour, (717) 352-8899



Dreamboat Hobbies, 2810 Pennsylvania Ave. W., Warren, PA 16365; Louie Dussia, (814) 723-8052



East St. Raceway & Art Center, 747 E. Railroad Ave., Verona, PA 15147; (412) 826-0602



East St. Raceway, 736 East Railroad Ave., Pittsburgh, PA 15147; Steve Maiolo, (412) 826-1324, (412) 826-0602



Henning Scale Models R/C Raceway, 128 S. Line St., Lansdale, PA 19446; Bill Henning, (215) 362-2442



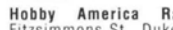
High Tek Hobbies, 13250 Rt. 30; N. Huntingdon, PA 15642; Ken Brooks, (412) 864-5278



Hipkins Hobbies Raceway, 402 W. Avondale-New London, West Grove, PA 19390; Doug Hipkins, (215) 869-8585



Hobby America Raceway, 5 Fitzsimmons St., Duke Center, PA 16729; Dan or Mike Coast, (814) 966-3765



Hobby Heaven, 1845 Rt. 422 West, Indiana, PA 15701; Scott McAdoo, (412) 463-8010



Hobby House Raceway, Downingtown Marketplace, Downingtown, PA 19335; J.T. Nelson, (215) 269-1300



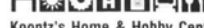
Hobby World Raceway, 172 Shillington Rd., Sinking Spring, PA 19608; Mike Wentzel, (215) 678-8760



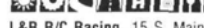
JR Hobby Shop & Raceway, 1806 Nagle Rd., Erie, PA 16501; Ron Bradear, (814) 898-1816



Koontz's Home & Hobby Center, 1205 Hoover St., Pittsburgh, PA 15204; (412) 331-3866



L&R R/C Racing, 15 S. Main St., Red Lion, PA 17356; Larry & Randy Shoemaker, (717) 244-1108



Main Hobby Race Center, 501 E. Lackawanna Ave., Olyphant, PA 18447; Dave or Zig, (717) 489-4566



Marshall's R/C Raceway, RR 4, Box 640, Honesdale, PA 18431; Bill or Dot Marshall, (717) 729-7458



Modellbahn Ott Hobbies, 1145 E. Philadelphia Ave. (Rt. 73), Gilbertsville, PA 19525; (215) 367-5925



Mountain R/C Raceway, 918 S. Park Ave., Somerset, PA 15501; Bob Rhodes, (814) 445-4085



Mt. Laurel Speedway, 835-8 Hiester Lane, Reading, PA 19605; Joe Vaccaro, (215) 921-0176



New Garden Farms/Mushroom Bowl, 812 W. Cypress St., Kennett Square, PA 19348; Drew Pannell, (215) 444-1850



Pit Stop Hobbies, 262 W. Main St., Mount Joy, PA 17552; James F. Stovot Jr., (717) 653-6222



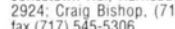
Pro Challenge Raceways, Wycombe Ave. (P.O. Box 536), Lansdowne, PA 19050; Bob Baldwin or Bob Paulauge, (215) 622-7651



Prop & Wheels Raceway, 139 W. Broadway, Tamaqua, PA 18252; (717) 668-2288



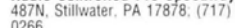
R&D Hobbies & Raceway, 5101-C Jonestown Rd., Harrisburg, PA 17112-2924; Craig Bishop, (717) 545-4984; fax (717) 545-5306



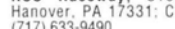
Race Place Hobbies, 201 Station Rd., Quakertown, PA 18951; (215) 538-2394



Radio Controlled Pro Speedway, Rt. 487N, Stillwater, PA 17878, (717) 387-0266



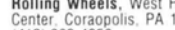
RCO Raceway, 519 Broadway, Hanover, PA 17331; Chris Shaffer, (717) 633-9490



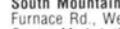
Riverside Raceway, PA Ave. W & Hickory, Warren, PA 16365; Jeff, (814) 723-4211



Rolling Wheels, West Hills Shopping Center, Coraopolis, PA 15108; Peggy, (412) 262-4858



South Mountain R/C Speedway, 357 Furnace Rd., Wernersville, PA 19565; George Merkel, (215) 267-4736



Staub Bros. R/C Speedway, 31 Locust St., Gettysburg, PA 17325; Todd or Scott Staub, (717) 334-5445



T&T Radio Controlled Racing, Randolph Rd., Great

Track Directory

RHODE ISLAND

East Bay Hobbies, 629 Metacomb Ave., Bristol, RI 02809; (401) 254-0778



R/C Hobbies, 47 Sandybottom Rd., Coventry, RI 02816; (401) 823-4335



Tri-State R/C Raceway, 205 Hallene Rd., Warwick, RI 02886; Raymond Dean, (401) 738-4908



SOUTH CAROLINA

Bandits Performance R/C Hobbies, P.O. Box 1533, Darlington, SC 29532; Bryan Howle Jr., (803) 393-3333



Berea R/C Speedway, 707 Sulphur Springs Rd., Greenville, SC 29611; (803) 246-4702



Capitol City Raceway, 1955 Legrand Rd., Columbia, SC 29223; Lee Mouton or Brooks Shealy, (803) 788-7749 or 788-4669



Coastal R/C Speedway, 8553 Hwy. 544, Myrtle Beach, SC 29577; Wendel Smith, (803) 236-9309



Inland R/C Speedway, 61 Newfound Lane, Myrtle Beach, SC 29577; James Watten, (803) 293-1753



Mid-Carolina R/C Superspeedway, 2222 Wintercrest Dr., Rock Hill, SC 29732; Fred Penland, (803) 328-8278



Monaco's Raceway, 727 E. Buena Vista Ave., N. Augusta, SC 29841; Bill Courson, (803) 279-8982



Palmetto Raceway, 5023A Rivers Ave., N. Charleston, SC 29418; (803) 566-0068



R/C Speed Shop & Raceway, 2122 Platt Springs Rd., W. Columbia, SC 29169; Eric Prevost, (803) 791-4715



Sidewinder's R/C Raceway Park, 1601-B West Enterprise St., North Charleston, SC 29406; Jimmy Closson, (803) 744-7441



Simpsonville International R/C Speedway, 3009 Bethel Rd., Simpsonville, SC 29681; Larry Chappellear, (803) 297-3572



TBS Superspeedway, 800 Hwy. 15N, Hartsville, SC 29550; Johnny Tiller, (803) 332-7117



SOUTH DAKOTA

CSF Speedway, Central States Fairgrounds, Creative Arts Bldg., 800 San Francisco St., Rapid City, SD 57702; Scoop Laskowski, (605) 342-5292



Dakota Off-Road Racers, 2989 W. Br. Co. 12, Aberdeen, SD 57401; (605) 226-0604



1/8-Scale Off-Road, 2989 W. Br. Co. 12, Aberdeen, SD 57401; Brian Bourdon, (605) 225-0803 (evening), 226-0604 (day)



Flags of Fun R/C Raceway, 2802 Eglin St., Rapid City, SD 57702; Rex Conrad or Scoop Caskowski, (605) 341-2186



TENNESSEE

Action Hobby Shop, 3723 S. Mendenhall, Memphis, TN 38115; Brian Stricklin or Justin Austein, (901) 365-2620



AIR Raceway, ByPass Hobbies, 1114 Hwy. 11 N., Athens, TN 37303; Bill Burris, (615) 744-8999



Butturi's Best Raceway, 4828 George Williams, Knoxville, TN 37922; Steve Butturi, (615) 531-0325



Crash-n-Burn R/C Raceway, 7030 Maynardville Pike, Knoxville, TN 37918; Gary Daniel, (615) 922-8722



Competition Park, Rt. 10, Box 268, Crossville, TN 38555; Terry or Yvette Bowen, (615) 277-5048



Cumberland Valley Raceway, P.O. Box 233, Ashland City, TN 37015; Jamie Pate, (615) 792-4371, ext. 1195



D&M's Downtown Raceway, 2703 US Hwy. 411S, Maryville, TN 37303; (615) 681-8919



Estill Springs Raceway, P.O. Box 187, Hwy. 41-A, Estill Springs, TN 37330; David or Wendy Panter, (615) 649-5113



Hobby World Raceway, 185 S. Jefferson, Cookeville, TN 38501; Scott Large or Scott Watson, (615) 528-2808



Lail Speedway, 812 Wells Rd., Maryville, TN 37801; Jack or Chris, (615) 983-9207



Mad Dog Motorsports, 707 Joy St. (Rt. 3, Box 247), Paris, TN 38242; Dan Mobley or Mike Andres, (901) 642-7794 or 644-1523



MSA R/C Racing, Rt. 12 Box H89 B, Crossville, TN 38555; D.R. Findley, (615) 456-0027



Panther Traxx, 7030 Maynardville Hwy., Knoxville, TN 37918; Gary Daniel, (615) 922-8722



Raceplace, 215 Lynn Garden Dr., Kingsport, TN 37660; Randy Horton, (615) 378-3330



Rivergate Hobby Center, 700A Two Mile Pkwy., Goodlettsville, TN 37072; David Hitt, (615) 859-3455



RMD Raceway, 175 Seavers Rd., Jackson TN 38301; Travis Robertson, (901) 424-0283



Smitty's Hobbies & Raceway, 6021 Dayton Blvd., Chattanooga, TN 37415; David Smith, (615) 877-9447



TNT Pro Hobbies, 5529 Pleasant View #2, Memphis, TN 38134; Tony Howell, (901) 377-0013



Tuckasee Off-Road Raceway, 1004 Lafayette Rd., Clarksville, TN 37042; Denny Hayward, (615) 645-2635



TEXAS

AA Raceway, 1617 Toomey Rd., Austin, TX 78704; (512) 474-8277



Anchored Acres Raceway, 1101 Sheppard Rd., Burkburnett, TX 76354; Bob & Patricia Veal, (817) 569-4707



Austin R/C Center, 9702 Gray Blvd., Austin, TX 78758; Caton Cobb, (512) 832-8144



B&C Speedway, 201 Enterprise Row, #101, Conroe, TX 77301; Bobby Hillin, (409) 760-1986



Budget Raceway, RR 1, Box 400 I-35, Bruceville, TX 76630; (814) 859-5296



Checkeder Raceway, 7121 Perimeter Park, Suite 214, Houston, TX 77099; Rod Ward, (713) 849-3054



Dove R/C Speedway, 400 South I-35, Bruceville, TX 76663; Curtis A. Rowe, (817) 757-1150



Eagle Hobby Center, 3601 Shepherd, Balch Springs, TX 75180; Terry Cooke, (214) 557-5290



Eastex Raceway, 45000 Hwy. 59 N., New Caney, TX 77357; Heinz Falke, (713) 399-1527



Hal's R/C Raceway, 1440 Bessemer, El Paso, TX 79936; (915) 591-2213



Heart o' Texas Hobbies & Raceway, 309 W. Hwy. 190, Copperas Cove, TX 76522; Larry Gholson, (817) 547-7505



Indy R/C World, 220 Mesquite Village, Mesquite, TX 75150; (214) 686-7744



J&K Speedway, 201 Enterprise Row, Suite 101, Conroe, TX 77301; J&K Hobbies, (409) 760-1986



Outlaw Speedway, Rt. 5, Box 173-3R, Lubbock, TX 79407; Derrell Butcher, (806) 885-4406



R/C Pro Shop, 12207 West County Road #129, Odessa, TX 79765



R/C Raceplace, 3546-A N. Main, Cleburne, TX 76031; Bruce Myers or Linda Achorn, (817) 558-2422



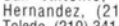
Randy's Hurricane Speedway, 9600-B Old Katy Rd., Houston, TX 77055; Randy Menchew, (713) 464-8020



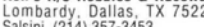
Rebel Hobbies & Raceways, 11925 Jones Maltsberger, San Antonio, TX 78216; George Norris, (210) 496-2396; fax, (210) 496-3294



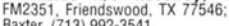
Riverty Speedway, 11731 Wetmore, San Antonio, TX 78247; Ralph Hernandez, (210) 359-6870; Joe Toledo, (210) 341-5652



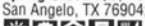
Ron's R/C Hobbies & Raceway, 2551 Lombardy, Dallas, TX 75220; Ron Salsini, (214) 357-3453



Southside R/C Raceway, 4409 FM2351, Friendswood, TX 77546; Roy Baxter, (713) 992-3541



Spring Creek R/C, 45 Fisherman's Rd., San Angelo, TX 76904; (915) 944-3850



Star/Car Raceway, 3908 Patton St., Corpus Christi, TX 78415; Dave Hunnicutt, (512) 853-0720; Race Hotline, (512) 881-6105



Star R/C Hobbies, 803 Garcia St., Port Isabel, So. Padre Island, TX 78578; Fred Carr, (512) 943-7546



T&T Eagle, 161 W. Spring Creek Pkwy., #601, Plano, TX 75023; Tony Welborn, (214) 517-0562



Texas Speedway, 6707 Chimney Rock, Houston, TX 77029; I&I Hobby Center, (713) 661-7137



Texas State Raceway, 3703 Seymour Rd., Wichita Falls, TX 76309; Chip Warman, (817) 692-2065



TK's R/C Park, 2921 Old Claude Hwy., Amarillo, TX 79101; (806) 622-0017



Wes Hobby, 980 S. 4th St., Beaumont, TX 77701; Edmond Richards, (409) 839-4929



Wild Bill's, 535 E. Shady Grove, Irving, TX 75060; Lynn Morgan or Jerry Williams, (214) 438-9224



UTAH

Hansen Intermountain R/C Raceway, 8481 W. 2700 S., Magna, UT 84044; Kevin Hansen, (801) 250-8303



High Anxiety, 271 N. Donlee Dr., St. George, UT 84770; (801) 673-9331



JD's Intermountain R/C Raceway, 1500 E. 1748 S., Vernal, UT 84078; John or Dora Frankovich, (801) 789-3930 or 789-8337



Power Hobbies & Raceway, 135 No. 900 East Suite 7, St. George, UT 84770; April Nutley, (801) 628-8747



Vision Hobby Raceway, 3528 N. State St., Orem, UT 84057; Vision Hobby, (801) 226-6226



WOR (Wasatch Off-Road Raceway), 3170 Brinker Ave., Ogden, UT 84401; Ultimate Hobbies, (801) 733-0933



VERMONT

Barre Town R/C Club, Wall St. Complex, S. Main St., Rt. 14, Barre, VT 05641; Daniel Guyette Sr., (802) 229-0639



Green Mountain Superspeedway & Hobbies, Elm St., Winooski, VT 05404; Charles Barsalow, (802) 893-2660



Hard Rock Raceway, Astrachan Dr., Bennington, VT 05201; Darren Ricchi, (802) 447-2656



Mike's Hobbies & Raceway, 162 N. Main St., Rutland, VT 05701; Stephen Rachlis, (802) 775-0059



Riverside R/C Speedway, Boyz R/C Hobbies, 700 Elm St., Winooski, VT 05404; Charles Barsalow, (802) 893-2660 or 893-2332



VIRGINIA

A-1 Raceways, 940 Radford Rd., Christiansburg, VA 24073; Kay or Charles Franks, (705) 381-9731 or 382-1173



Bob's Hobbies & Raceway, 910-J Brandy Creek Dr., Mechanicsville, VA 23111; Bob Wagner, (804) 746-2758



Cooper's R/C Raceway, Rt. 4, Box 1228, Chatham, VA 24531; (804) 724-4182



Craftech Challenge, Naval Base D-4, Piesey St., Norfolk, VA 23455; Bernie Duffy, (804) 444-3846



Crossroads Hobbies R/C Raceway, 1104 W. Main St., Salem, VA 24153; Ronnie Black, (703) 387-3414



Front Royal R/C Racing Association, P.O. Box 1252, Front Royal, VA 22630; Pete Pomeroy, (703) 636-6149



H&S R/C Raceway, 565 Electric Rd., Salem, VA 24153; Henry Dowd or Stacy LaPrade, (703) 343-4012



Hobby Hangar Speedway, 4433A Brookfield Corp. Dr., Chantilly, VA 22021; Kwang Ko, (703) 631-8820



Hobby Shack and Track, Route 2, Box 184, St. Stephens CH, VA 23148; John or Laura Holder, (804) 769-1311



KC's Radio Control & Repair, Rt. 4, Box 312, Trents Ferry Rd., Lynchburg, VA 24503; Curtis or Kim Wright, (804) 384-8596



Lane's End Raceway, P.O. Box 153, Bridgewater, VA 22612; Tony Strother, (703) 828-6655 or 3471



Mid Atlantic Raceway, 89 E. Elizabeth St., Harrisburg, VA 22801; (703) 433-3952



NSWC MWR R/C Track, C1243C Dahlgren, VA 22448; Doris Copen, (703) 663-1730



SHAMROC, P.O. Box 3739; Winchester, VA 22604; Glenn Bland, (703) 888-3927



Sterling Truck & Auto Racers, 20921 Davenport Dr., Sterling, VA 22170; Ron Beckman, (703) 444-0333



Four Season R/C Racing, 2941 Sleater Kinney Rd. NE, Olympia, WA 98506; Gary & Sharon Brown, (206) 491-2430



Hank Perry Race Complex, Sullivan Rd., WA 99213; (509) 927-1879



L&L R/C Raceway, 15818 SE, 287th, Kent, WA 98042; Eric Lake or Bob Lewis, (206) 639-1241 or 631-1664



NORA Performance R/C, P.O. Box 955 (1673 Cedardale Rd.), Mt. Vernon, WA 98273; (206) 755-9464



Raceway Hobbies, 188 Sunset Ave. S., Edmonds, WA 98020; Dave or Ron Steen, (206) 774-3285



Schmidt's Auto Parts, 10305 Old Hwy. 99, Marysville, WA 98271; Jon Failla, (206) 653-8838



Spokane Indoor Raceway, E. 6422 2nd Ave., Spokane, WA 99212; Mike Giendern, (509) 534-RACE



Tacoma R/C Raceway Hobbies, 6305 6th Ave., Tacoma, WA 98406; (206) 565-1935



Tearor Raceway, 8012 S. Tacoma Way, Tacoma, WA 98499; Dave Kleinman, (206) 584-8659



WEST VIRGINIA

Burr-Fab Raceway, 90 Davis St., West Union, WV. 26456; Mark Travis, (304) 873-2487



D.W. Reed's, 142 West Main, Bridgeport, WV, 26330; David Reed, (304) 842-2742



Fairmont R/C Raceway, 430 Fairmont Ave., Fairmont, WV 26554; Ed Kirby, (304) 363-5509



Fulton's R/C Raceway, 2646 Chapline St., Wheeling, WV 26003; James Fulton, (304) 233-5355



R/C Race Place, Rt. 10, Box 351, Morgantown, WV 26505; (304) 292-0811



R/C Speed, Rt. 1, Box 363, Ronceverte, WV 24970; Joe, (304) 647-4162



WISCONSIN

ABC R/C, 1441 B East Main St., Waukesha, WI 53186; Dick, (414) 542-1245



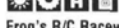
Antigo Hobby, 311 Superior St., Suite 7, Antigo, WI 54409; (715) 623-7655



Arena Park Raceway, Kenosha County Parks, 7727 60th Ave., Kenosha, WI 53142; David Delabio, (414) 657-6371



Fox Valley Off-Road Racing Club, R1, Mayflower Rd., Hortonville, WI 54944; (414) 739-9211



Frog's R/C Raceway, Rt. 1, Phillips, WI 54555; (715) 339-2314 or 339-2958



Gary's Hobby Center, 3701 Durand Ave., Racine, WI 53403; Ron, (414) 554-8884 or 1-800-894-6229



Grant County Speedway, 2125 Oak, Hazel Green, WI 53811; Brad Birkette, (608) 854-2246



Hobbytown Speedway, 4231 8th St. S., Wisconsin Rapids, WI 54494; (715) 421-1222



JJ's Dirt Heaven, 6028 County K, Champion, WI 54229; (414) 866-9096



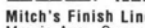
Maniac Motors Raceway, 244 Rt. 1 A1 Rt. H, Kendall, WI 54638; (608) 462-8935



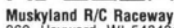
MARCCA Raceways, 1810 S. Park St., Madison, WI 53713; Jeff Gundlach, (608) 273-0519



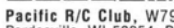
Midwest Tri-Clone, 144 N. Main St., West Bend, WI 53095; (414) 334-0487



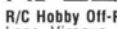
Mitch's Finish Line R/C Inc., 786 Morris Ave., Green Bay, WI 54304; (414) 497-5057



Muskyland R/C Raceway, Rt. 10, Box 269, Hayward, WI 54843; Jim Ahrens, (715) 634-2109



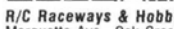
Pacific R/C Club, W7990 Hwy. P, Pardeeville, WI 53954; Rhys Brenner, (608) 742-7100



R/C Hobby Off-Road Track, Lewison Lane, Viroqua, WI 54665; Dan and Diane Sawvell, (608) 637-8221



R/C Raceway, 2239 Cty. Rd. E., Baldwin, WI 54002; Lance Van Damme, (715) 684-2690



R/C Raceways & Hobbies, 181 W. Marquette Ave., Oak Creek, WI 53154; Ralph & Cathy Augustino, (414) 764-9701



Radio Mania, 129 Harrison St., North Prairie, WI 53153; Bill Bowes, (414) 392-9515



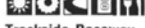
Richland Center R/C Off-Road Racing Club, Fairground Rd., Richland Center, WI 53581; Rick & Cheryl Stussy, (608) 647-7313



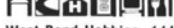
Sparta R/C Raceway, Golf Course Rd., Sparta, WI 54656; Eric Johnson, (608) 269-5861 or 269-6613



Stoltz Raceways, 548 Summit Dr., West Bend, WI 53095; (414) 338-6097



Trackside Raceway, 4405 W. Bradley, Milwaukee, WI 53223; Joel Gish, (414) 355-1910



West Bend Hobbies, 144 N. Main St., West Bend, WI 53040; (414) 334-0487



WYOMING

Collectable Creations Off-Road Oval Track, 1790 Dell Range Blvd., Cheyenne, WY 82009; Phil Severson, (307) 632-2156



AUSTRALIA

Wodonga R/C Car Club, 11 Murphy St., Wodonga, VIC 3690; Ron Langman, 011-6160-247-128



Aubry R/C Car Club, Aubry Showgrounds, Aubry, NSW 2640; Ron Langman, 060-247-128



BELGIUM

Cartroubles Indoor Buggy Track, Jan Moonsstraat 52-56, 2160 Wommelgem, Belgium; Guy Ermes, 32-3-326-51-15, fax, 32-3-326-51-01



BRAZIL

Hobby Center, SQS.210 B.H. Apt. 204, Brasilia, DF-Brasilia 70.273; 061-242-0488



Off Roaders, Av. Guillerme Dummont Villars, 317, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931



Way of R/C Off-Road Cerrado, Rua Fernandes Tourinho 999, 4th Floor, Belo Horizonte, MG; Claudio Teodoro Corra, (55) 31-223-3676



CANADA

Action Wheelz, 462 Turcotte, Vanier, Quebec G1M 1R6; Regent Tardif, (418) 527-5756



Andy's R/C Raceway, Box 423, Lac La Biche, AB T0A 2C0; Andy Bryks, (403) 623-2951



Aprilla Track, 20 Parsons Ridge, Kanata, Ontario K2L 2N4; (613) 836-2577



ATN, 2000 Paul Hubert, Nicolet, Quebec J0G 1E0; Louis Durand, (819) 293-6097



Autodrome des Prairie, 935 Boul. St-Luc, St-Luc, Quebec J0J 2A0; (514) 348-0718



Cactus Speedway, Con. #3 Ruthven at Colastanti's, Ruthven, Ontario N8N 2W6; Lanny Fitzpatrick, (519) 735-3039; Wayne Telasco, (519) 966-0702



Circuit Pepsi, Centre de Location, 37 duRoi, Sorel, Quebec; (514) 746-8828



Circuit R/C Bonzai, 164 Cowie, Granby, Quebec J2G 3V3; (514) 372-3622



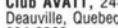
Circuit St-Denis Auto Téléguides, 292 DuLion, St-Denis sur Richelieu, Quebec, J0H 1K0; Francois Rivard, (514) 787-1127



Circuit Teleguide Ville Mercier, 1101 St Jean Baptiste, Mercier, Quebec J6R 1C6; Norm Foster, (514) 699-4003



Club AVATT, 244, rue Hotel de Ville, Deauville, Quebec; Daniel Vanier, (819) 864-6262



Crash Course, Box 9, Site 8, RR #1, Spruce Grove, Alberta T7X 2T4; Tim Starrevied (403) 963-5795



CRCCC, Box 309, Clinton, Ontario NOM 1L0; Eric Russell (519) 482-9429



Dynamic Hobbies, 21 Concourse Gate, Unit 6, Nepean, Ontario K2E 7S4; Clark Freeman, (613) 225-9634



East Coast Model Center Raceway, 13 Glen Stewart Dr., Suite 1, Southport, Prince Edward Island. C1A 8X9; Gary Stephen, (902) 569-3262



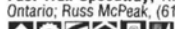
East Wind Farm, R/C Corral, Perimeter Hwy., Plessis Rd. South, Springfield, Manitoba; Chito De Jesus, (204) 775-9180



Fast-Trax Speedway, RR 4, Trenton, Ontario; Russ McPeak, (613) 394-6411



The Glass Castle Off-Road, RR#7 Trans Canada Hwy., Duncan, B.C. V9L 6P4; Don Douthwright, (604) 746-6518



GRSCR, 9 Gauthier, St-de L'Achigan, Quebec J0K 3H0; (514) 588-4254



Honda House Motor Speedway, 384 Richmond St., Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530



Interior R/C Racers, 311-1780 Springview Pl., Kamloops, BC. V2E 1J4; Martin Vannieuwenhuizen, (604) 374-1268



IROCC Off-Road, Hartland Rd., Victoria, B.C., Gary Allen, (604) 478-8004



Ivan's Playground, 2220 Dewdney Ave., Regina, Sask., S4R 1H3; Ivan or Conrad, (306) 757-8881



J-T International Raceway, 127 Milligan Lane, Napanee, Ontario K7R 8A1; N. O'Neill, (613) 354-0099



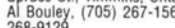
Kamloops Dirt Burners, 311-1780 Springview Pl., Kamloops, BC, V2E 1J4; Martin Vannieuwenhuizen, (604) 374-1268



Kiwanis Radio Control Club, 410 Spruce St., Timmins, Ontario P4N 4S7; Al Bouley, (705) 267-1569; fax, (705) 268-9129



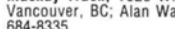
Krazy Trak, 2412 Miller Ave., Saskatoon, Sask.; Brian & Bart Kendel, (306) 221-7344



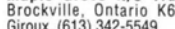
Mackay Track, 1025 W. 14th, North Vancouver, BC; Alan Walrond, (604) 684-8335



Maple Grove R/C Track, RR #3, Brockville, Ontario K6V 5T3; Ray Giroux, (613) 342-5549



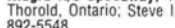
MORRAC Raceway, 6449 Crowchild Tr. SW., Box 36060, Calgary, Alberta T3E 7C8; Gary Fliegel, (403) 254-1386



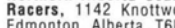
Niagra R/C Speedway, 1874 Hwy. 20, Thorold, Ontario; Steve Ingram, (416) 892-5548



Northern Alberta Scale Car Auto Racers, 1142 Knottwood Rd. E., Edmonton, Alberta, T6K 2J8; Dean Simpson, (403) 461-3432



Quintrax Speedway, Box 1034, Belleville, Ontario K8N 5B6; (613) 962-1414; fax: (613) 962-7306



Radical Raceway, 150 Bradwick Drive, Unit 25, Concord, Ontario L4K 1K8; Roland Glass, (416) 660-5238



Rousillon Hobby Track, 177-D St-Jean Baptiste, Chateauguay, Quebec J6K 3B4; (514) 698-2151



RR0L, Nordon Restaurant, Hamilton Rd. at Commissioners Rd., London, Ontario; Mark Hennion, (519) 457-2758



Seaway Valley R/C Raceway, RR 1, Iroquois, Ontario K0E 1K0; Orville or Carol Smyth, (613) 652-4953



Thunder Alley, 1380 London Rd., Sarnia, Ontario N7S 1P8; Rob Smith, (519) 882-3361



Top Qualifier Race Club, McKay Park, North Vancouver, B.C.; Derrick Vandekraats, (604) 985-3948

Union Creek Speedway, 281 Henderson Highway, Winnipeg, Manitoba R2L 1M4; MRCAR c/o Kelvin Community Centre, (204) 667-9186

Universal R/C Speedway, Niagara St., Welland, Ontario; (416) 735-5051

West Coast R/C Raceway, 190-7771 Alderbridge Way, Vancouver, B.C. V5C 3A3; Michael Ma or Kelly Ho, (604) 276-8779

WORRC, 861 Isack Dr., Windsor, Ontario N8S 3W6; Pete Adams, (519) 944-8519 or 974-3346

Woodstock Speedway, Queen St., Woodstock, NB; Woodstock Hobby, (506) 325-2067

DENMARK

Rainbow Raceway, Eriksvej. 9 Glostrup, Copenhagen 2600; P. Christiansen, 011-45-52-848-504



Holstebro R/C Buggy Club, Mozartsvej 7500 Holstebro, Denmark 2600; Michael Brushholt, 011-45-97-412-734



FRANCE

Auto Electron, 35, rue B. de Ventadour, Limoges, France 87000; M. Boudoul, 55 062763



GERMANY

Mini Car Club Dortmund, Kortschstr. 4, 4600 Dortmund 13, Germany; Roland Schwan, 0231/213609



SCOPING OUT

NOVAK 410-M1

by JOHN RIST

I'VE ALWAYS felt that a good way to pick the best equipment for racing is to observe what the world-class drivers are using. One name, Novak, will always turn up on the "speed-controller-used" column from any national or international race. With this in mind, I was excited to get my hands on their latest offering—the 410-M1. But wait; if my memory was serving me, I had "scoped" the 410-M1 last year, so how could Novak call this a *new* speed controller? A quick comparison between the controller in my hand and the original "Scoping Out" article revealed that there are major differences between the two speed controllers.

The new controller doesn't have a reverse-voltage protection fuse like the original M1; it has built-in, solid-state,

reverse-voltage protection. If you accidentally hook it up backward, it just sits there waiting for you to get it right—no blown fuses or solder links to repair. If you've ever blown up a speed controller in your panic to make the starting flag, then you can appreciate what a great feature this is.

Another new feature is a second braking FET that guarantees the new 410-M1 won't have wimpy brakes. Another fact that speaks well of the 410-M1's ability is that it's virtually identical to the 410-M1c, except it lacks the M1c's current limiter (hence the "c"). This super-trick, small, light, racing-style speed controller features:

- forward only with brakes;



- five FETs for forward and two FETs for brakes;
- massive three-wire system for low resistance (14AWG);
- high-frequency motor control;
- electronic, thermal-overload protection.

It's supplied with an instruction book, a battery-to-motor wire, a screwdriver, adjustment-hole plugs, a heat sink, Novak's five-input-plug system and Deans new Ultra Plug for battery and motor connection.

To verify that the 410-M1 is truly a top-of-the-line speed controller, I opened it up and looked inside. It was easy to open; I simply removed the four screws from the bottom. Novak has molded a very generous overlapping lip-and-groove arrangement into the case halves that should seal as well as the old, ill-fitting O-ring, which they eliminated. This setup definitely makes the controller a lot easier to reassemble after you've cleaned it.

The 410-M1 sports two printed-circuit boards that are stacked on top of each other and are covered with surface-mounted components. The FETs that carry the heavy current (which you need to win!) have leads that pass through the boards, and they're soldered to massive strips of

NOVAK 410-M1

DIMENSIONS:

Height	0.75 in.
Width	1.4 in.
Length	1.58 in.
Weight with wires	1.9 oz.

TUNING:

Access to controls.....	Excellent
Ease of adjustment.....	Very good

PRICE:

List price	\$140
Warranty	90 days

ELECTRICAL: (Manufacturer's specs)

Max. voltage.....	10 cells
Min. voltage.....	4 cells
Max. current	unlisted

Continuous current.....	250 amps
Resistance.....	0.0030 ohm

TEST PARAMETERS:

Voltage	6 volts
Current	12 amps
Voltage drop along length of wire.....	0.07 volt
Voltage drop 2 inches along wire	0.05 volt

Calculated resistance:

Voltage drop/current = resistance

Resistance to end of wires	0.0058 ohm
Resistance 2 inches along wire	0.004 ohm
BEC voltage, 6-cell pack	5.75 volts

COMMENTS:

The 410-M1 has world-class low "on" resistance—a feature that permits it to handle modified motors and that has consistently placed it in the winners' circle. Its overall high performance and small size are the result of good design and the use of space-age components. The 410-M1 output frequency switches at 2500Hz instead of at the normal 60Hz found in most controllers. This high-frequency output reduces armature wear, increases run times, reduces motor heating, and provides smoothness and control in the lower throttle ranges. The braking action is strong, yet controllable. The 410-M1 only differs from the 410-M1c in that M1c has a current-limit feature. If your experience or the advice of trusted racing friends indicates that current limiting is not important to your style of racing (high-speed oval, drag racing, truck-pulling, or backyard buddy bashing), then the 410-M1 will give you a big bang for a low buck. It's a totally trick component for your racing arsenal.

etched-copper conductors. Novak has done a super job of stuffing a multitude of functions into a really small package. It incorporates all the necessary tricks for super-low "on" resistance.

It was time to put Novak's winning reputation to the test—that is, the "Scoping Out" lab test. If the 410-M1's performance was as outstanding as it promised to be, it would truly be a winner. To test a speed controller, it needs to be fired up and pumping current. Before you install any speed controller, it's always best to read the instruction book to learn the manufacturer's do's and don'ts. I was a little surprised when I dug around in the box and found an instruction book for the Novak 410-M5. However, there are many similarities between the two models, so the 410-M5 instruction book is sufficient. The major difference is the number of motor and battery wires; the 410-M1 has a three-wire hookup, and the 410-M5 has four wires coming out of its side. Novak has added several supplemental instruction sheets: one is labeled "Read Me First"; another covers the installation of the Deans Ultra Plug three-wire setup; a third covers Novak's new electronic reverse-voltage protection; and the fourth describes how to reposition the trigger on a Futaba Magnum Jr. This modification to the Jr. increases forward-trigger travel range; this permits the radio to take full advantage of the 410-M1's incredibly smooth throttle response. It's important to pay particular attention to the sheet that describes the Deans Ultra Plug three-wire setup. If you follow the wiring diagram in this picture, you should have a setup that's "goof-proof."

VOLTAGE-DROP TEST

With the 410-M1 connected and running, it was time for the "on" resistance test. "On" resistance is hard to measure directly, so I measure the voltage drop across the speed controller while I pass 12 amps of current through it.

With 12 amps of current flowing, I measured the end-to-end voltage drop along the wires and found it to be 0.07 volt—a resistance of 0.0058 ohm. A reading at 2 inches along the wires showed a voltage drop of 0.05 volt—a resistance of 0.004 ohm. I quickly checked past speed controllers' "on" resistances and found that the new-and-improved 410-M1's "on" resistance is slightly lower than the original 410-M1. You'll have to search hard to find a lower "on" resistance in

"SCOPING OUT" LAB AND TESTS

THE LAB consists of:

- an oscilloscope
- a digital voltmeter
- a variable-load resistor bank
- a 6V 30A electricity supply
- a Pit Stop Radio servo/speed controller tester.

The oscilloscope is used to monitor the controller's output and to guarantee that it's fully on.

The digital voltmeter takes all the voltage-drop readings and verifies the reading on the current meter.

The resistor load bank consists of 40, 12-ohm, 5W power resistors that can be switched on and off one at a time to vary the load between 0.6 amp and 20 amps, but the standard 12 amps are usually used.

In series with the resistors is a 25A Simpson current meter and a 1-percent 0.01-ohm resistor. By measuring the voltage drop across this resistor, the current-meter's reading can be double-checked. Of course, the lab power supply provides the test current.

• VOLTAGE-DROP TESTS.

These are the first tests. It's virtually impossible to read an ESC's resistance directly, so I measure the voltage drop across it with the resistor bank set up for 12 amps of current. I then calculate the controller's "on" resistance by dividing the measured voltage drop by 12 amps. I take the voltage reading twice: along the full length of the battery and motor wires (including connectors) and 2 inches along them. The first reading helps me to determine an ESC's "on" resistance as it comes from the factory, and the second gives a standard reading with which I compare ESCs.

• LET-IT-COOK TEST.

I adjust the resistor bank to pass 20 amps of current, then I jam the throttle wide open and let the ESC pump the 20 amps.

• DEAD-SHORT TEST.

With this test, I check whether the controller can survive the heavy current caused by a jammed gear or a fried motor. No one likes to have this kind of trouble and discover that his ESC has been destroyed, too.

another controller. Novak produces lean, mean, trick, racing machinery.

LET-IT-COOK TEST

For this test, I jack the current up to 22 amps and let the controller run wide open for 15 minutes. I ran this test with the heat sinks in place to see whether the thermal shut-down would work. In the interest of performing a really tough test, I didn't use a fan to cool the heat sinks. After 15 minutes, the 410-M1 was quite warm, but it stayed well below safe operating temperature (the automatic, thermal cutoff was never activated). This was no surprise, considering the 410-M1's very low "on" resistance. The 410-M1 will handle a modified motor with ease; just position it so that it receives some cooling air, and use the heat sinks.

DEAD-SHORT TEST

I have a piece of monster wire that I use for my dead-short test. I clip the ugly thing right across the motor wires so that the current will jump to 40 amps (the limit of my power supply). I also run this test with the heat sinks in place but without a cooling fan.

I jammed the pedal to the metal for 1 minute, and the controller was just a little warm. If you do a little calculating, you'll find that a 1700mAh battery pack will deliver 40 amps for a mere 2.4 min-

utes. Checking my original test of the 410-M1, I found that I let it run for a full 4 minutes at the 40A level with no ill effects. The 410-M1 appears to be able to survive a lot of abuse, including burned-up motors and jammed gears. No controller is totally bulletproof, however, and considering a battery pack can deliver over 100 amps, it makes good sense to back off the throttle when your car starts to "run funny." A little common sense could save some very expensive equipment.

ROAD TEST

With all the bench tests completed, it was time for the best part of speed-controller testing: time to mount the 410-M1 in a car and have fun!

I mounted the 410-M1 in my tried and true Kyosho Sideways. The 410-M1 is very small, and it fits in the allotted space with gobs of room to spare. I used Litespeed connectors between the batteries and the speed controller. The price is right on these connectors, and they incur almost no voltage drop. Their only disadvantage is that motor spray can destroy them, and they can be plugged in backward. I haven't encountered either disaster, because I'm careful not to spray motor cleaner directly onto my connectors, and I keep them together by adding a drop of CA to the red-and-black

connector pair. If you don't already have Litespeed connectors on all your equipment, as I have, the Deans Ultra Plug looks like a good, safe, connector system to consider. I've never liked motor connectors, so I hard-wire my motors. It's a little inconvenient when cleaning a motor, but I can usually let the motor dangle on the end of its wires when I clean it between races. I immerse the motor in a jar of Bolink Electro Whirl motor cleaner and run it slowly (using the transmitter); this cleans it without the danger of high-rpm damage.

The only hitch with installing the 410-M1 is that it's a three-wire controller. This means that you need to run an extra red wire (supplied by Novak with the 410-M1) from the battery to the motor. The main difficulty in accomplishing this with the Lite Speed connectors is getting both red wires installed into one connector contact. I usually remove some of the strands from both wires and twist them together until they'll fit into the connector contact. Other times, I add the second red wire by making a "T" splice about 1/2 inch from the battery connector. Just be sure that you cover the joint with shrink tubing or tape. Remember, a Ni-Cd battery pack can deliver over 100 amps through a short; a battery pack on fire is not a pretty sight.

IN THE HOT SEAT!

With the controller installed and several battery packs charged, I headed for some pavement to test-drive this awesome speed controller. If you've never driven one of the new, high-frequency speed controllers, you're in for a treat. A high-frequency controller has the advantages of longer run times, less wear and tear on the brushes and a cooler-running motor, but I think its smoothness is its biggest advantage.

Later, I found that even during the holeshot from the line, this smoothness made it possible to control wheel spin.

From the very first jab of the throttle, I knew that this was one hot speed controller. My Sideways is a heavy car and makes a lot of demands on a controller, but it rocketed up and down the pavement. The 410-M1's throttle response is so smooth, however, that it's possible (and fun) to run the car dead slow.

All of the run times were good—usually more than 4 minutes, despite fast gearing. A check of the heat sinks after

each run verified that this controller has really low "on" resistance. The heat sinks were running stone cold, even though the motor was so hot that it could burn your finger—a sure sign that all the power is getting to the motor and that none of it is wasted in the 410-M1. I also played with the brakes to see if they worked, and I found they were very strong (strong enough to make the Sideways do 180-degree sliding turns). They should be adequate on even the tightest roadcourse.

The current limiter is the only feature missing from this controller. When I talked to fellow racers who have current-limiting-style speed controllers, I found that many were running with the limits wide open. So, if your racing style finds you running flat out and wishing you had even more punch, I doubt that you'll miss the current limiter.

CONCLUSION

When it comes to raw performance, it just doesn't get much better than the 410-M1. A check of the "equipment used" column in the A-Mains in almost any national-level race will turn up numerous 410-M1s. It has world-class, low "on" resistance, and it has all the advantages of a high-frequency controller, including longer run times, longer motor life, and most of all, smooth driving. Owing to its low "on" resistance, this controller will handle modified motors with ease.

Its high-current-handling capability is the result of having very large motor and battery wires, a beefy printed-circuit board and five very good (and probably very expensive) FETs. The braking action is strong and should be adequate for any roadcourse.

One advantage of buying any Novak speed controller is great factory support. If your controller is out of warranty and needs repair, the most it can cost you is \$27.50 for a replacement unit, which comes with an accessory kit, instructions and a 90-day warranty. That, my good racing fans, is what I call guaranteed customer satisfaction!

Just remember, if you buy a 410-M1, you'll have to find a new excuse for not winning, because the 410-M1 is a proven major-race winner.

**Here's the address of the company featured in this article:*
Novak Electronics Inc., 18910 Teller Ave., Irvine, CA 92715. ■

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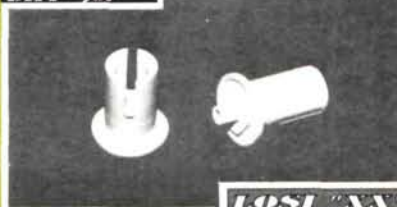


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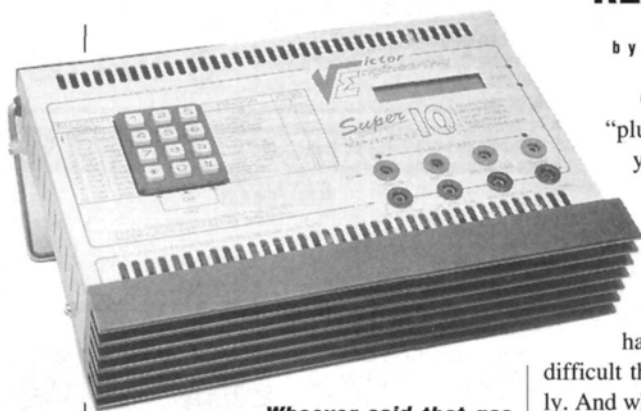


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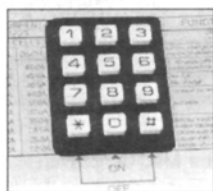
NITRO NEWS

REALITY CHECK

by JEFF BRONSTEIN



Whoever said that gas racing is too technical has obviously never looked into the pit



box of a serious electric racer! If you can operate one of these techno-gadget chargers, you can pilot the space shuttle!

Most of these high-end chargers can be used for the batteries in a gas car.

THIS IS A TEST! For the next two pages, this magazine will be conducting a test of the "Emergency Reality Check System."...

If this had been an actual reality emergency, the tone you just heard (answer the door, by the way) would be followed by important "Nitro News" and factual information. This is only a test....!

• **Reality check 1.** Gas racing is difficult. NOT!

I've probably heard it a thousand times: "Yea, Jeff I sure would love to get into gas racing like you, but isn't it a lot tougher than electrics?" I grab a handful of hair and try to refrain from committing some sort of criminal battery. Gas racing definitely *isn't* any more difficult to master than the current club-level electric racing outfit. You wouldn't think of peaking your best cells without a little common sense and experience, so why does it seem so unusual that gas racing has its own learning curve?

Come on, get away from that "plug-it-in-and-go" mentality. If you face electrics, you're already halfway there; in fact, most gas fanatics have electric experience. Chassis setup and tuning are exactly the same. Tuning engines is a hands-on job, but it's no more difficult than charging batteries properly. And who said you could only do one or the other (hope your wife/husband doesn't read this!)?

• **Reality check 2.** Gas requires too much support equipment.

In any scale, electric or gas, it's nice to have some high-tech support gear to "tweak out" your car. Sadly, I think some people buy this stuff just to look cool at the track, and they don't have a clue what it does. Gas racing definitely has its share of nifty little devices, but not even Ralph Burch, the current 1/8-scale national champion, has nearly the number of gizmos electric racers seem compelled to buy.

Hey, what's that guy doing with a computer in his pit? Gone are the days when a good charger had a timer dial and a bell. Now, it's multi-function, high-frequency, pushed, programmable, digitized, computerized, synthesized, micro-sized and who knows what other "ized."

Gas racing is far less "gizmo intensive." In addition to the car itself, all you really need are a starter (for engines that don't include one) and a simple glow-plug igniter. Want an engine pyrometer or tire durometer? Great, knock yourself out! Now you have everything you could possibly want. I still use the "spit" test most of

the time, and I bet I can feel which tire is softer within five points. All this stuff is just "stuff" until you learn how to drive the car.

• **Reality check 3.** Gas engines are finicky and unreliable.

Gas engines *aren't* finicky and unreliable; *people* are. Engines do what they're designed to do, and if used and maintained properly, they'll perform considerably longer than the average modified electric motor and battery pack. In the past five years, engine technology has improved immensely, and the major manufacturers have fine-tuned their products to exacting tolerances. Today, the chief cause of engine failure is not poor quality; it's almost always user-related.

Almost anyone can test motor brushes and punch batteries until he's blue in the face, but too few racers have the

PRICE COMPARISONS—RACING TRUCKS

EQUIPMENT	GAS	ELECTRIC
Truck kit LX-T	\$179.99	\$179.99
Radio (XL-2P; two servos)	\$90	\$90
ESC (std.)	—	\$100
Batteries (std.; five packs)	—	\$125
Charger (peak)	—	\$100
Motors (three; stock)	—	\$84
Conv. kit w/engine	\$265	—
Glow-plug igniter	\$25	—
Fuel (20-percent nitro)	\$25	—
Subtotal	\$584.99	\$678.99

patience necessary to methodically tune an engine. Heck, if you can't just flip a switch, it must be broken, right? Wrong! Assuming the car and engine have been set up somewhere near the manufacturer's suggested specs, there are only three very basic rules to follow when tuning an engine.

- If it's too hot, the engine is too lean.
- If it's too cold, the engine is too rich.
- If it's not doing the first two, something *is* wrong, but don't bury it before you find out what it is. *This is*

Tune it up!

First, let's review. The engine is the little metal thing just in front of the transmission, which is the thing in the back. Got it? Now, the engine thing runs on stuff that burns, so it gets kinda hot. If the engine thing gets too hot, it doesn't want to push the transmission thing. So, the trick is to keep the engine thing as cool as possible while still making the transmission thing—and the car thing—go fast!

Let's assume that everything else is in working order; in other words, the fuel tank and lines don't leak, the drive train doesn't bind, and the tires are on the wheels. Engines like things that way. Fresh fuel is also a must. Remove the glow plug and, while holding it with a pair of pliers, insert it into the igniter to verify that it burns correctly. The



The "black art" of engine tuning rests here—in the carburetor's fuel/air mixture adjustment point. Master these settings, and you're on the way to nitro nirvana.

When the engine starts, don't rev it! Let it reach operating temperature before you attempt to tune it. As it heats up, check the head temperature frequently. At this point, the engine should still sound "sloppy" or "labored"—as if it can't clear out. This is commonly referred to as "four-stroking," and it's caused by an overly rich fuel mixture.

Begin to lean out the engine by closing the high-end needle valve in amounts of 3 degrees or less, or two clicks at a time. Monitor the head temperature by putting a drop of water or saliva (I know it sounds gross) onto the heat sink. As you near the proper setting, the water should bubble and steam. Never allow an engine to get so hot that it hops around as if it's on a hot griddle. That's way too hot and things will start to break.

The engine note should begin to clear out, and a steady stream of smoke should trail out of the exhaust. The water should boil off in 2 or 3 seconds, and the engine's top speed should now be fairly high. Try not to run the engine wide open for extended periods. In a race, a long straightaway hardly ever takes longer than 5 seconds.

Also, engines keep heating for several minutes after they've reached a proper tune, so continue to check the head temperature even if the engine sounds good. If possible, keep the fuel mixture just slightly on the rich side for the best lubrication. As you gain more experience, you will learn to recognize the limitations of your engine.



Head temperature is the barometer of engine tuning. Most find that the simple "spit" test is more than adequate for gauging engine temperature, but for those who want more accuracy, temperature probes, such as this "yellow jack-et" from Paris Racing*, are readily available.

platinum wire should burn with a very bright, yellow glow.

With the plug reinstalled (don't forget the small brass gasket washer), fuel the tank and open the high-end needle valve to the recommended setting (usually two or three turns). First, with the igniter off, turn the engine over several times to force fuel into the carburetor. Then, with the igniter in place and the throttle set at idle, attempt to start the engine. If it sounds as if it wants to start, but it won't run, close the needle valve about 5 degrees and repeat. If, after several tries, nothing happens, review paragraph two before continuing.

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important! (For more detailed information on how to tune engines, read "Nitro News" regularly.)

• **Reality check 4.** Too much invested in electrics to switch.

Listen, very few people have the cash to buy all their racing gear in one day—or one month, for that matter, although I have seen some pretty hefty buying sprees. It takes me two or three days just to decide what I want to buy!

If, however, you're a club-level electric racer, you already own much of the equipment you need to race gas.

For instance, most radio gear is meant for electric *or* gas racing. Hardware, shocks, tires, wheels, tire truers—even some battery chargers—can all be used in gas racing, too. Manufacturers are making the switch particularly painless and easy for you off-road types; with conversion kits for your loyal Losi LX-Ts and Associated RC-10Ts, you won't miss a beat.

Watch out though, the new gas-powered trucks are on their way, and they're *tough!* In fact, the idea of having "over-invested" in anything

suggests that it's about time to try something new—fast.

• **Reality check 5.** Gas racing is just a fad.

Wrong again! I hate to burst the bubble, folks, but R/C racing was invented when some nutty slot-car fanatic stuck a 2-stroke model airplane engine on a homemade R/C chassis. That's right; gas was around long before cars driven by electric DC motors were even thought of. Virtually everywhere in the world except the U.S., gas racing is the most popular class. Huge permanent tracks dot the European, British and Asian countrysides. Now that the state-side nitro invasion has begun, it looks as if nothing can stop it.

• **Reality check 6.** Gas racing is too expensive.

Numbers speak louder than words in this case. Take a look at two identical racing outfits, one gas and one electric (see table). They're both competitive race trucks, with the latest high-performance features. In this example, I use the Losi LX-T, but it could just as easily be an Associated, Traxxas, or any other competitive truck. The conversion kit includes a CZ-R engine with a pull-starter. Of course, buying a purpose-built gas racing truck might be less expensive than buying a truck and conversion kit. The truck and much of the equipment is a wash on both sides; for instance, both need radio, tires, suspension hop-ups, etc. Clearly, the competitive gas version is less expensive, even with some electric parts left over (sell the tranny to your buddy). The comparison could easily apply to any electric class. Gas racing can be less expensive than your current addiction, and it definitely costs less than psychotherapy. OK, sure; in the short run, some 1/8-scale racing *will* be more expensive than 1/10 scale, but over time, they'll just about even out.

This has been a test of the Emergency Reality Check System. This magazine, in cooperation with local, state and federal racing authorities have established this system to keep you constantly informed.

**Here is the address of the company mentioned in this article:*
Paris Racing, 4254 Independence St., Chino, CA 91710. ■

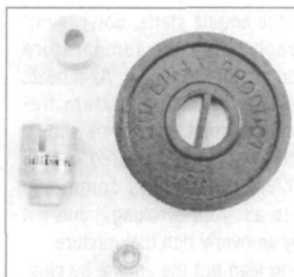
Nitro Essentials

Getting into gas may be cheaper and easier than you think. Here's a look at what you'll need to get started (literally).

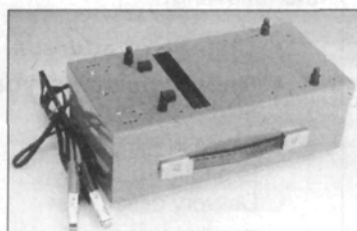


1/10-scale gas vehicles require only a small hand-held starter.

1 First, you have to make the engine turn over, so you'll need some kind of starter (unless your model's engine has its own pull-starter). Most



2 Oh, and you'll also need a rubber wheel for your starter. This wheel is what you "bump" against your engine's fly-wheel to make it turn.



3 For the larger, 1/8-scale vehicles, you might want to invest in a starter box. The box configuration allows you to start your engine quickly and easily because the box's posts align your engine's fly-wheel with the rubber starting wheel.



4 Once your engine is turning, you'll need to ignite the glow plug to make it start, so you'll need to invest in a glow plug igniter.



5 Let's see...did I forget something? Oh, yes—fuel!

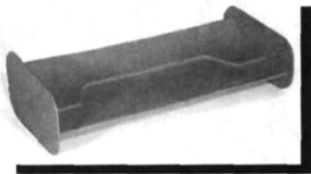
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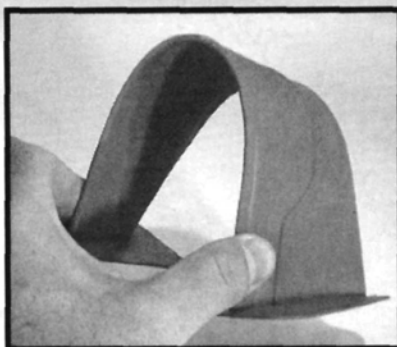
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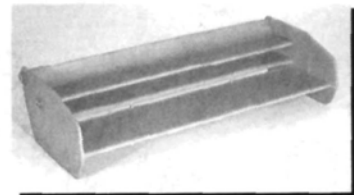
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SCHUMACHER 2000

(Continued from page 100)

DRIVING IMPRESSIONS

First runs are always filled with hope and a sense of excitement. But first, the 2000 needed to look fantastic. I asked the two-time concours winner of the U.S. Oval Masters to add a coat of paint. Mike Kornblatt of MK Custom Paint* produced a most radical paint job. So I was off to my local track with visions of success racing through my mind. The track's surface was damp, hard-packed clay that would provide plenty of traction. There were many jumps, a washboard section, hairpins and a large sweeper entering the long straight where I could let it rip. I set the speed controller and dialed-in the radio. All that was left was to seat the clutch disk and set its tension.

I cruised the first few laps to get the feel of things and then began to drive it hard. I quickly noticed the pleasant whistle of the gear train as I blistered down the straight. The 2000 jumped well, was stable in the rough sections, and undoubtedly turned tighter than any Schumacher I have ever driven. It dug in its claws and sprinted from corner to corner with plenty of forward bite. Indeed, I could immediately notice a difference with the gear-driven transmission. It

was much easier to drive hard and more predictable in the corners. I could put the car anywhere.

The first battery was drained, and it was off to the pits to fit the rear of the 2000 with some micro spikes, change the gearing, and put in another battery. Before my day of testing was finished, few changes had to be made to suit my driving style. I used the packed-dirt/damp setup described in the manual except that I used the short Ackerman link, changed the caster inserts to -10 degrees W.R.T. (with respect to) the rake angle and put the rear upper control link in hole 6. In all, I was very pleased with the car and feel that it is very adjustment sensitive. When you change something, you can really feel it on the track.

CONCLUSIONS

The Cougar 2000 is the finest 2WD that Schumacher has ever produced, and it's already their best-selling car. It's easy to assemble, and it should gain respect as a very versatile car that can win on any track surface. Beginners and advanced modelers will enjoy its durability with its lightweight construction.

*Here are the addresses of the companies mentioned in this article:

Schumacher Inc., 6302 Benjamin Rd., Suite #404, Tampa, FL 33634.

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.

Precision Motor Works, 4950 Waring Rd., #12, San Diego, CA 92120.

Stealth Electronics, 5534 Las Virgenes Rd., #115, Calabasas, CA 91302.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

MK Custom Paint, 818 South Naples Way, Aurora, CO 80017.

TRACK DIRECTORY

(Continued from page 123)

INDONESIA

Beverly's Racing, Palm St., 188, Surabaya, Jatim, Indonesia; Jhon Mudik, 011-62-31-595-888



ISRAEL

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ITALY

Associazione Modellisti Cossato, via P. Maffei, Cossato 13014, Biella, Italy; Zanellato Romildo, 015-405881, fax 015-922709



JAPAN

Courtney Off-Road, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; USMC Arts & Crafts, 011-81-61173-53674



Foster R/C Raceway, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; Camp Foster Arts & Crafts, 011-81-61173-53674



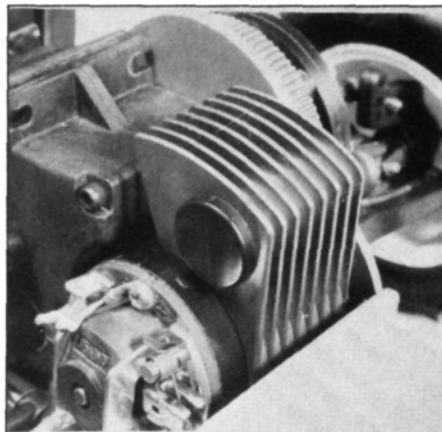
Hansen Off-Road, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; USMC Arts & Crafts, 011-81-61173-53674



Iwakuni R/C Track, PSC 561, Box 978, FPO AP 96310-0978; David T. Eck, 011-81-6117-53-3662



(Continued on page 169)



#2002 SUPER COOLER II

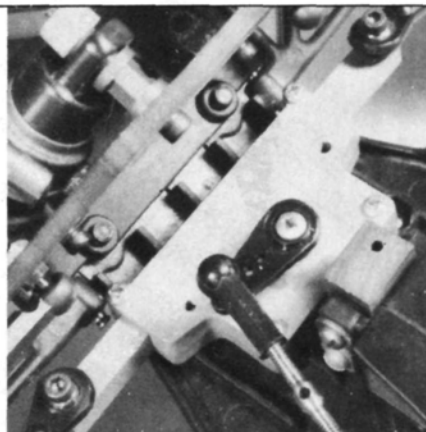
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#3000 PRO STEER Rack and Pinion

WE READ MINDS

I was wondering if you were going to do a review of Panda's new Nitro Pickup racing truck. I'm thinking about buying one, and I want to know more about it.

I'm also wondering where I could get some Cobwebs in a Can by Coverite. Can you order it straight from the factory? If not, where can I get some?

ADAM SOLTANI
Arvada, CO

Adam, the review of the Panda Nitro Pickup is in the works; look for it soon. As for the Cobwebs in a Can, check with your local hobby shop, or contact Coverite directly. And check out "How to Paint Bodies" in this issue for web-making tips from Mike "Spiderman" Ogle!

JH

SPEED FREAK

I have an RC10 and would like to know how fast it goes. Is there a way to do this?

TRAPPER NICHOLSON
Auburn, WA

Well, Trapper, I'm gonna take a wild guess here, but I'm assuming you're talking about your car's overall top speed. To calculate its mph, you can make a speed trap. Make two visible lines across a track, 100 feet apart. Ask a friend to stand between the lines with a stopwatch. Get a running start so that your car is at top speed before it hits the first line. Have your friend start timing your car as soon as it crosses the first line, then stop as it crosses the second one. Now, here's how you calculate your top speed: divide the distance covered (100 feet) by the time it took to cover the distance (in seconds), then multiply the answer by 0.68 to get your actual mph. Your equation will look like this: $mph = (100 / \text{number of seconds}) \times 0.68$. Good luck with your upcoming test session.

JH

WHERE'S THE WORKS?

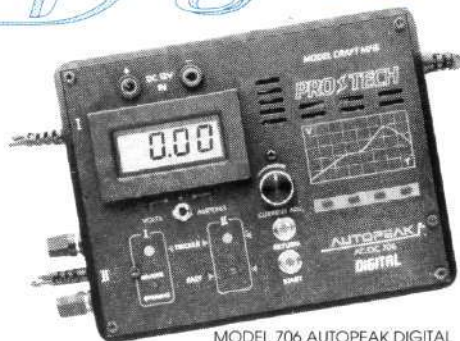
I love your magazine. Before I had received the first issue, I knew nothing about R/C cars. Now I am interested in buying a Yokomo Works '93 4WD car. It was shown in the May '93 issue in your "Top 10 Cars" feature. I am wondering if you could help me find a company or store that carries them. I really appreciate your help!

PETER LOJAC
Lindenhurst, NY

Peter, Bob Stormer of Stormer Racing is now importing the Yokomo line of cars, including the Works '93 car. You can contact him at (406) 228-4569, or for orders only, use the toll-free line (800) 255-7223.

JH

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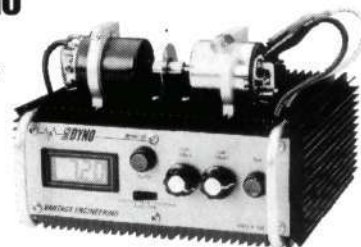
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TRACK NAME

ADDRESS

CITY, STATE, ZIP

CONTACT

TELEPHONE

- | | |
|------------------------------------|---|
| ☐ Indoor | ☐ Asphalt |
| ☐ Outdoor | ☐ On-site hobby shop |
| ☐ Off-road | ☐ AC power |
| ☐ Oval | ☐ Auto lap-counting |
| ☐ Dirt oval | ☐ Food available |
| ☐ Carpet | ☐ Handicap access |
| ☐ Concrete | |

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251 Danbury Road, Wilton, CT 06897

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